

# **VEVE AT ARBOR GREEN APARTMENTS**

**Alachua County, Florida**

**FK Project No. 5479**

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## **PROJECT MANUAL**

**Issue for Bid**

**September 11, 2018**



**FUGLEBERG KOCH**

**VEVE AT ARBOR GREEN APARTMENTS**

**ALACHUA COUNTY, FLORIDA**

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VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

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DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Fugleberg Koch LLC / James E. Kelley, Jr., AIA.
2. Florida License No: AR0009897
3. Responsible for Divisions 01-31 Sections except where indicated as prepared by other design professionals of record.

B. Civil Engineer: Provided by Owner under Separate Agreement/Package

C. Landscape Architect: Provided by Owner under Separate Agreement/Package

D. Structural Engineer:

1. Advanced Structural Design, Inc. / John Bailes
2. Florida License No.
3. See index for section responsibility.

E. M.E.P Engineer:

1. MiGre Consulting Engineers/ Greg Klebanoff & Mike Dodane
2. Florida License No.:
3. See index for section responsibility

END OF DOCUMENT 000107

DOCUMENT 001113 - ADVERTISEMENT FOR BID

1.1 PROJECT INFORMATION

- A. Notice to Bidder: The Bidder may submit the Bid for project as described in this Document. Submit bid according to the Instructions to Bidder.
- B. Project Identification: See SECTION 011000 - SUMMARY.
- C. Owner: See SECTION 011000 - SUMMARY.
  - 1. Owner's Representative: See SECTION 011000 - SUMMARY.
- D. Architect: See SECTION 011000 – SUMMARY.
- E. Project Description: See SECTION 011000 - SUMMARY.
- F. Construction Contract: Bid will be received for the following Work:
  - 1. General Contract (all trades).

1.2 BID SUBMITTAL AND OPENING

- A. Owner will receive the bid at the bid time and date at the location given below.
  - 1. Bid Date: \_\_\_\_\_
  - 2. Bid Time: 10 am, local time.
  - 3. Location: Quivet Creek Development, LLC  
800 Highlands Ave.  
Suite #200  
Orlando, FL 32803
- B. Bid will be opened privately.

1.3 DOCUMENTS

- A. Printed Procurement and Contracting Documents: The Owner or Architect will NOT print and distribute plans or specifications.
- B. Online Procurement and Contracting Documents: The Prime Bidder can obtain access by contacting Owner.

1.4 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Upon Owner acceptance of the Bid, the Bidder shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time. Work is subject to liquidated damages. The Liquidated Damages amount per day will be determined and agreed to by both parties and included in the final Owner Contractor agreement.

1.5 BIDDER CONFIRMATION MATERIAL REQUIRED.

- A. Bidder must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required.

END OF DOCUMENT 001113



# DRAFT AIA® Document A701™ - 1997

## Instructions to Bidders

### for the following PROJECT:

(Name and location or address)

Veve at Arbor Green Apartments in Alachua County  
near the corner of Newberry Road and NW 136<sup>th</sup> Street.

### THE OWNER:

(Name, legal status and address)

Quivet Creek Development LLC  
800 Highland Avenue, Suite 200  
Orlando, FL. 32803  
407-340-5583  
Agent: Mike Harmon  
[mharmon@qcdevelopment.com](mailto:mharmon@qcdevelopment.com)  
863-289-9757

### THE ARCHITECT:

(Name, legal status and address)

Fugleberg Koch, LLC  
2555 Temple Trail  
Winter Park, FL 32789  
Architect's Representative:  
James E. Kelley, Jr. AIA

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- 2 BIDDER'S REPRESENTATIONS
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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.



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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 other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

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

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

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for 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 the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

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

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

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

## ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 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 personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

## ARTICLE 3 BIDDING DOCUMENTS

### § 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 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.

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

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

### § 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

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

### § 3.3 SUBSTITUTIONS

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

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. 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.

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

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

### § 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

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

## ARTICLE 4 BIDDING PROCEDURES

### § 4.1 PREPARATION OF BIDS

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

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

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures 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."

§ 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 make no 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 of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give 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.

#### § 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, 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. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, 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 the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

#### § 4.3 SUBMISSION OF BIDS

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

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

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

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

#### § 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

## ARTICLE 5 CONSIDERATION OF BIDS

### § 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated 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 Bids may be made available to Bidders.

### § 5.2 REJECTION OF BIDS

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 to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 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 low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

## ARTICLE 6 POST-BID INFORMATION

### § 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

### § 6.2 OWNER'S FINANCIAL CAPABILITY

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

### § 6.3 SUBMITTALS

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

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

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

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

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

## ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

### § 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 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 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

### § 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 be commenced prior thereto 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. Both bonds shall be written in the amount of the Contract Sum.

§ 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 thereto a certified and current copy of the power of attorney.

## ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A102 Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price.

DOCUMENT 002213 - SUPPLEMENTARY INSTRUCTIONS TO BIDDER

1.1 INSTRUCTIONS TO BIDDERS

- A. Instructions to Bidder for Project consist of the following:
1. AIA Document A701, "Instructions to Bidders.
  2. The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

1.2 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

- A. The following supplements modify AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

1.3 ARTICLE 2 - BIDDER REPRESENTATIONS

- A. Add Section 2.1.3.1:
1. 2.1.3.1 - The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.
- B. Add Section 2.1.5:
1. 2.1.5 - The Bidder is a properly licensed Contractor according to the laws and regulations of Alachua County Florida and meets qualifications indicated in the Procurement and Contracting Documents.
- C. Add Section 2.1.6:
1. 2.1.6 - The Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.

1.4 ARTICLE 3 - BIDDING DOCUMENTS

- A. 3.1 Copies
1. Delete Section 3.1.1. Replace 3.1.1 with the following: The Owner will provide a digital copy of the bidding documents to qualified bidders.
- B. 3.2 - Interpretation or Correction of Procurement and Contracting Documents:

1. Add Section 3.2.2.1:
  - a. 3.2.2.1 - Submit Bidder's Requests for Interpretation using form **to be provided by Owner.**

C. 3.4 - Addenda:

1. Delete Section 3.4.3 and replace with the following:
  - a. 3.4.3 - Addenda may be issued at any time prior to the receipt of bids.
2. Add Section 3.4.4.1:
  - a. 3.4.4.1 - Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:
    - 1) 3.4.4.1.1 - Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.
    - 2) 3.4.4.1.2 - Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

1.5 ARTICLE 4 - BIDDING PROCEDURES

A. 4.1 - Preparation of Bids:

1. Add Section 4.1.1.1:
  - a. 4.1.1.1 - Printable electronic Bid Forms and related documents are available from the Owner.
2. Add Section 4.1.8:
  - a. 4.1.8 - The Bid shall include unit prices when called for by the Procurement and Contracting Documents. Owner may elect to consider unit prices in the determination of award. Unit prices will be incorporated into the Contract.
3. Add Section 4.1.10:
  - a. 4.1.10 - Bids shall include sales and use taxes. Contractor shall show separately with each monthly payment application the sales and use taxes paid by them and their subcontractors in the form indicated. Reimbursement of sales and use taxes, if any, shall be applied for by Owner for the sole benefit of Owner.

B. 4.5 - Break-Out Pricing Bid Supplement:

1. Add Section 4.5:



- a. 4.5 - Provide detailed cost breakdowns no later than two business days following Owner/Architect's request.
  - C. 4.6 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:
    1. Add Section 4.6:
      - a. 4.6 - Provide list of major subcontractors, suppliers, and manufacturers furnishing or installing products no later than **two** business days following Owner / Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling three percent or more of the Bid amount. Do not change subcontractors, suppliers, and manufacturers from those submitted without approval of Owner / Architect.
  - D. 6.3 - Submittals:
    1. Add Section 6.3.1.4:
      - a. 6.3.1.4 - Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than two business days following Owner's request.
- 1.6 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND
- A. 7.1 - Bond Requirements:
    1. Add Section 7.1.1.1:
      - a. 7.1.1.1 - Both a Performance Bond and a Payment Bond will be required, each in an amount equal to 100 percent of the Contract Sum.
  - B. 7.2 - Time of Delivery and Form of Bonds:
    1. Delete the first sentence of Section 7.2.1 and insert the following:
      - a. The Bidder shall deliver the required bonds to Owner no later than **10** days after the date of Notice of Intent to Award and no later than the date of execution of the Contract, whichever occurs first. Owner may deem the failure of the Bidder to deliver required bonds within the period of time allowed a default.
    2. Delete Section 7.2.3 and insert the following:
      - a. 7.2.3 - Bonds shall be executed and be in force on the date of the execution of the Contract.
- 1.7 ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
- A. Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A102 Standard Form of Agreement Between Owner and Contractor

where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price as modified by Owner and as required to meet lender requirements.

1.8 ARTICLE 9 - EXECUTION OF THE CONTRACT

A. Add Article 9:

1. 9.1.1 - Subsequent to the Notice of Intent to Award, and within **10** days after the prescribed Form of Agreement is presented to the Awardee for signature, the Awardee shall execute and deliver the Agreement to Owner in such number of counterparts as Owner may require.
2. 9.1.2 - Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.
3. 9.1.3 - Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement.

END OF DOCUMENT 002213

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, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Soil-boring data for Project, obtained by \_\_\_\_\_ is available for viewing as appended to this Document.
- C. A geotechnical investigation report for Project, prepared by \_\_\_\_\_ is available for viewing as appended to this Document.
- D. Related Requirements:
  - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF DOCUMENT 003132

SECTION 005000 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Provide on format " STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR" WHERE THE BASIS OF PAYMENT IS THE COST OF WORK PLUS A FEE WITH A GUARANTEED MAXIMUM PRICE," AIA Document A-102, 2017 Edition.

END OF SECTION 005000

# DRAFT AIA® Document A102™ – 2017

## *Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price*

**AGREEMENT** made as of the « » day of « » in the year « »  
(In words, indicate day, month and year.)

**BETWEEN** the Owner:  
(Name, legal status, address and other information)

« »  
« »  
« »  
« »

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

« »  
« »  
« »  
« »

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

« »

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

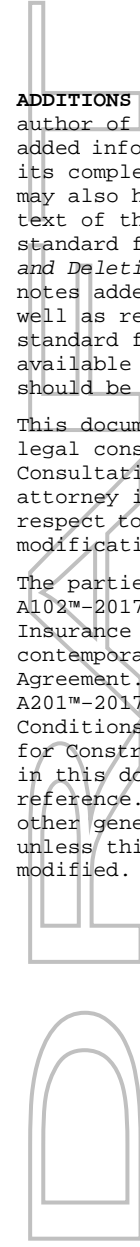
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« »  
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« »

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 A102™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.



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### 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. If anything in the other Contract Documents, other than a Modification, is inconsistent with this Agreement, this Agreement shall govern. An enumeration of the Contract Documents, other than a Modification, appears in Article 16.

#### ARTICLE 2 THE WORK OF THIS CONTRACT

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

#### ARTICLE 3 RELATIONSHIP OF THE PARTIES

The Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

**ARTICLE 4 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

§ 4.1 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.

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

**§ 4.3 Substantial Completion**

§ 4.3.1 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: [  ]

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

Portion of Work	Substantial Completion Date

§ 4.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 4.3, liquidated damages, if any, shall be assessed as set forth in Section 5.1.6.

**ARTICLE 5 CONTRACT SUM**

§ 5.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum is the Cost of the Work as defined in Article 7 plus the Contractor’s Fee.

§ 5.1.1 The Contractor’s Fee:

*(State a lump sum, percentage of Cost of the Work, or other provision for determining the Contractor’s Fee.)*

[  ]

§ 5.1.2 The method of adjustment of the Contractor’s Fee for changes in the Work:

[  ]

§ 5.1.3 Limitations, if any, on a Subcontractor’s overhead and profit for increases in the cost of its portion of the Work:

[  ]

§ 5.1.4 Rental rates for Contractor-owned equipment shall not exceed [  ] percent ( [  ] %) of the standard rental rate paid at the place of the Project.

§ 5.1.5 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)

§ 5.1.6 Liquidated damages, if any:

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

<< >>

§ 5.1.7 Other:

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

<< >>

§ 5.2 Guaranteed Maximum Price

§ 5.2.1 The Contract Sum is guaranteed by the Contractor not to exceed << >> (\$ << >> ), subject to additions and deductions by Change Order as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

§ 5.2.2 Alternates

§ 5.2.2.1 Alternates, if any, included in the Guaranteed Maximum Price:

Item	Price

§ 5.2.2.2 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

§ 5.2.3 Allowances, if any, included in the Guaranteed Maximum Price:

(Identify each allowance.)

Item	Price

§ 5.2.4 Assumptions, if any, upon which the Guaranteed Maximum Price is based:

(Identify each assumption.)

<< >>

§ 5.2.5 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order.

§ 5.2.6 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 5.2.4. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 5.2.4 and the revised Contract Documents.



## ARTICLE 6 CHANGES IN THE WORK

§ 6.1 Adjustments to the Guaranteed Maximum Price on account of changes in the Work may be determined by any of the methods listed in Article 7 of AIA Document A201™–2017, General Conditions of the Contract for Construction.

§ 6.2 Adjustments to subcontracts awarded on the basis of a stipulated sum shall be determined in accordance with Article 7 of A201–2017, as they refer to “cost” and “fee,” and not by Articles 5, 7 and 8 of this Agreement.

Adjustments to subcontracts awarded with the Owner’s prior written consent on the basis of cost plus a fee shall be calculated in accordance with the terms of those subcontracts.

§ 6.3 In calculating adjustments to the Guaranteed Maximum Price, the terms “cost” and “costs” as used in Article 7 of AIA Document A201–2017 shall mean the Cost of the Work as defined in Article 7 of this Agreement and the term “fee” shall mean the Contractor’s Fee as defined in Section 5.1.1 of this Agreement.

§ 6.4 If no specific provision is made in Article 5 for adjustment of the Contractor’s Fee in the case of changes in the Work, or if the extent of such changes is such, in the aggregate, that application of the adjustment provisions of Article 5 will cause substantial inequity to the Owner or Contractor, the Contractor’s Fee shall be equitably adjusted on the same basis that was used to establish the Fee for the original Work, and the Guaranteed Maximum Price shall be adjusted accordingly.

## ARTICLE 7 COSTS TO BE REIMBURSED

### § 7.1 Cost of the Work

§ 7.1.1 The term Cost of the Work shall mean costs necessarily incurred by the Contractor in the proper performance of the Work. The Cost of the Work shall include only the items set forth in this Article 7.

§ 7.1.2 Where, pursuant to the Contract Documents, any cost is subject to the Owner’s prior approval, the Contractor shall obtain such approval in writing prior to incurring the cost.

§ 7.1.3 Costs shall be at rates not higher than the standard paid at the place of the Project, except with prior approval of the Owner.

### § 7.2 Labor Costs

§ 7.2.1 Wages or salaries of construction workers directly employed by the Contractor to perform the construction of the Work at the site or, with the Owner’s prior approval, at off-site workshops.

§ 7.2.2 Wages or salaries of the Contractor’s supervisory and administrative personnel when stationed at the site and performing Work, with the Owner’s prior approval.

§ 7.2.2.1 Wages or salaries of the Contractor’s supervisory and administrative personnel when performing Work and stationed at a location other than the site, but only for that portion of time required for the Work, and limited to the personnel and activities listed below:

*(Identify the personnel, type of activity and, if applicable, any agreed upon percentage of time to be devoted to the Work.)*

« »

§ 7.2.3 Wages or salaries of the Contractor’s supervisory or administrative personnel engaged at factories, workshops or while traveling, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

§ 7.2.4 Costs paid or incurred by the Contractor, as required by law or collective bargaining agreements, for taxes, insurance, contributions, assessments, and benefits and, for personnel not covered by collective bargaining agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in the Cost of the Work under Sections 7.2.1 through 7.2.3.

§ 7.2.5 If agreed rates for labor costs, in lieu of actual costs, are provided in this Agreement, the rates shall remain unchanged throughout the duration of this Agreement, unless the parties execute a Modification.

### **§ 7.3 Subcontract Costs**

Payments made by the Contractor to Subcontractors in accordance with the requirements of the subcontracts and this Agreement.

### **§ 7.4 Costs of Materials and Equipment Incorporated in the Completed Construction**

**§ 7.4.1** Costs, including transportation and storage at the site, of materials and equipment incorporated, or to be incorporated, in the completed construction.

**§ 7.4.2** Costs of materials described in the preceding Section 7.4.1 in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, if any, shall become the Owner's property at the completion of the Work or, at the Owner's option, shall be sold by the Contractor. Any amounts realized from such sales shall be credited to the Owner as a deduction from the Cost of the Work.

### **§ 7.5 Costs of Other Materials and Equipment, Temporary Facilities and Related Items**

**§ 7.5.1** Costs of transportation, storage, installation, dismantling, maintenance, and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by construction workers that are provided by the Contractor at the site and fully consumed in the performance of the Work. Costs of materials, supplies, temporary facilities, machinery, equipment, and tools, that are not fully consumed, shall be based on the cost or value of the item at the time it is first used on the Project site less the value of the item when it is no longer used at the Project site. Costs for items not fully consumed by the Contractor shall mean fair market value.

**§ 7.5.2** Rental charges for temporary facilities, machinery, equipment, and hand tools not customarily owned by construction workers that are provided by the Contractor at the site, and the costs of transportation, installation, dismantling, minor repairs, and removal of such temporary facilities, machinery, equipment, and hand tools. Rates and quantities of equipment owned by the Contractor, or a related party as defined in Section 7.8, shall be subject to the Owner's prior approval. The total rental cost of any such equipment may not exceed the purchase price of any comparable item.

**§ 7.5.3** Costs of removal of debris from the site of the Work and its proper and legal disposal.

**§ 7.5.4** Costs of the Contractor's site office, including general office equipment and supplies.

**§ 7.5.5** Costs of materials and equipment suitably stored off the site at a mutually acceptable location, subject to the Owner's prior approval.

### **§ 7.6 Miscellaneous Costs**

**§ 7.6.1** Premiums for that portion of insurance and bonds required by the Contract Documents that can be directly attributed to this Contract.

**§ 7.6.1.1** Costs for self-insurance, for either full or partial amounts of the coverages required by the Contract Documents, with the Owner's prior approval.

**§ 7.6.1.2** Costs for insurance through a captive insurer owned or controlled by the Contractor, with the Owner's prior approval.

**§ 7.6.2** Sales, use, or similar taxes, imposed by a governmental authority, that are related to the Work and for which the Contractor is liable.

**§ 7.6.3** Fees and assessments for the building permit, and for other permits, licenses, and inspections, for which the Contractor is required by the Contract Documents to pay.

**§ 7.6.4** Fees of laboratories for tests required by the Contract Documents; except those related to defective or nonconforming Work for which reimbursement is excluded under Article 13 of AIA Document A201-2017 or by other provisions of the Contract Documents, and which do not fall within the scope of Section 7.7.3.

**§ 7.6.5** Royalties and license fees paid for the use of a particular design, process, or product, required by the Contract Documents.

§ 7.6.5.1 The cost of defending suits or claims for infringement of patent rights arising from requirements of the Contract Documents, payments made in accordance with legal judgments against the Contractor resulting from such suits or claims, and payments of settlements made with the Owner's consent, unless the Contractor had reason to believe that the required design, process or product was an infringement of a copyright or a patent, and the Contractor failed to promptly furnish such information to the Architect as required by Article 3 of AIA Document A201-2017. The costs of legal defenses, judgments, and settlements, shall not be included in the Cost of the Work used to calculate the Contractor's Fee or subject to the Guaranteed Maximum Price.

§ 7.6.6 Costs for communications services, electronic equipment, and software, directly related to the Work and located at the site, with the Owner's prior approval.

§ 7.6.7 Costs of document reproductions and delivery charges.

§ 7.6.8 Deposits lost for causes other than the Contractor's negligence or failure to fulfill a specific responsibility in the Contract Documents.

§ 7.6.9 Legal, mediation and arbitration costs, including attorneys' fees, other than those arising from disputes between the Owner and Contractor, reasonably incurred by the Contractor after the execution of this Agreement in the performance of the Work and with the Owner's prior approval, which shall not be unreasonably withheld.

§ 7.6.10 Expenses incurred in accordance with the Contractor's standard written personnel policy for relocation and temporary living allowances of the Contractor's personnel required for the Work, with the Owner's prior approval.

§ 7.6.11 That portion of the reasonable expenses of the Contractor's supervisory or administrative personnel incurred while traveling in discharge of duties connected with the Work.

#### § 7.7 Other Costs and Emergencies

§ 7.7.1 Other costs incurred in the performance of the Work, with the Owner's prior approval.

§ 7.7.2 Costs incurred in taking action to prevent threatened damage, injury, or loss, in case of an emergency affecting the safety of persons and property, as provided in Article 10 of AIA Document A201-2017.

§ 7.7.3 Costs of repairing or correcting damaged or nonconforming Work executed by the Contractor, Subcontractors, or suppliers, provided that such damaged or nonconforming Work was not caused by the negligence of, or failure to fulfill a specific responsibility by, the Contractor, and only to the extent that the cost of repair or correction is not recovered by the Contractor from insurance, sureties, Subcontractors, suppliers, or others.

#### § 7.8 Related Party Transactions

§ 7.8.1 For purposes of this Section 7.8, the term "related party" shall mean (1) a parent, subsidiary, affiliate, or other entity having common ownership of, or sharing common management with, the Contractor; (2) any entity in which any stockholder in, or management employee of, the Contractor holds an equity interest in excess of ten percent in the aggregate; (3) any entity which has the right to control the business or affairs of the Contractor; or (4) any person, or any member of the immediate family of any person, who has the right to control the business or affairs of the Contractor.

§ 7.8.2 If any of the costs to be reimbursed arise from a transaction between the Contractor and a related party, the Contractor shall notify the Owner of the specific nature of the contemplated transaction, including the identity of the related party and the anticipated cost to be incurred, before any such transaction is consummated or cost incurred. If the Owner, after such notification, authorizes the proposed transaction in writing, then the cost incurred shall be included as a cost to be reimbursed, and the Contractor shall procure the Work, equipment, goods, or service, from the related party, as a Subcontractor, according to the terms of Article 10. If the Owner fails to authorize the transaction in writing, the Contractor shall procure the Work, equipment, goods, or service from some person or entity other than a related party according to the terms of Article 10.

### ARTICLE 8 COSTS NOT TO BE REIMBURSED

§ 8.1 The Cost of the Work shall not include the items listed below:

- .1 Salaries and other compensation of the Contractor's personnel stationed at the Contractor's principal office or offices other than the site office, except as specifically provided in Section 7.2, or as may be provided in Article 15;
- .2 Bonuses, profit sharing, incentive compensation, and any other discretionary payments, paid to anyone hired by the Contractor or paid to any Subcontractor or vendor, unless the Owner has provided prior approval;
- .3 Expenses of the Contractor's principal office and offices other than the site office;
- .4 Overhead and general expenses, except as may be expressly included in Article 7;
- .5 The Contractor's capital expenses, including interest on the Contractor's capital employed for the Work;
- .6 Except as provided in Section 7.7.3 of this Agreement, costs due to the negligence of, or failure to fulfill a specific responsibility of the Contract by, the Contractor, Subcontractors, and suppliers, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable;
- .7 Any cost not specifically and expressly described in Article 7; and
- .8 Costs, other than costs included in Change Orders approved by the Owner, that would cause the Guaranteed Maximum Price to be exceeded.

## **ARTICLE 9 DISCOUNTS, REBATES AND REFUNDS**

**§ 9.1** Cash discounts obtained on payments made by the Contractor shall accrue to the Owner if (1) before making the payment, the Contractor included the amount to be paid, less such discount, in an Application for Payment and received payment from the Owner, or (2) the Owner has deposited funds with the Contractor with which to make payments; otherwise, cash discounts shall accrue to the Contractor. Trade discounts, rebates, refunds, and amounts received from sales of surplus materials and equipment shall accrue to the Owner, and the Contractor shall make provisions so that they can be obtained.

**§ 9.2** Amounts that accrue to the Owner in accordance with the provisions of Section 9.1 shall be credited to the Owner as a deduction from the Cost of the Work.

## **ARTICLE 10 SUBCONTRACTS AND OTHER AGREEMENTS**

**§ 10.1** Those portions of the Work that the Contractor does not customarily perform with the Contractor's own personnel shall be performed under subcontracts or other appropriate agreements with the Contractor. The Owner may designate specific persons from whom, or entities from which, the Contractor shall obtain bids. The Contractor shall obtain bids from Subcontractors, and from suppliers of materials or equipment fabricated especially for the Work, who are qualified to perform that portion of the Work in accordance with the requirements of the Contract Documents. The Contractor shall deliver such bids to the Architect and Owner with an indication as to which bids the Contractor intends to accept. The Owner then has the right to review the Contractor's list of proposed subcontractors and suppliers in consultation with the Architect and, subject to Section 10.1.1, to object to any subcontractor or supplier. Any advice of the Architect, or approval or objection by the Owner, shall not relieve the Contractor of its responsibility to perform the Work in accordance with the Contract Documents. The Contractor shall not be required to contract with anyone to whom the Contractor has reasonable objection.

**§ 10.1.1** When a specific subcontractor or supplier (1) is recommended to the Owner by the Contractor; (2) is qualified to perform that portion of the Work; and (3) has submitted a bid that conforms to the requirements of the Contract Documents without reservations or exceptions, but the Owner requires that another bid be accepted, then the Contractor may require that a Change Order be issued to adjust the Guaranteed Maximum Price by the difference between the bid of the person or entity recommended to the Owner by the Contractor and the amount of the subcontract or other agreement actually signed with the person or entity designated by the Owner.

**§ 10.2** Subcontracts or other agreements shall conform to the applicable payment provisions of this Agreement, and shall not be awarded on the basis of cost plus a fee without the Owner's prior written approval. If a subcontract is awarded on the basis of cost plus a fee, the Contractor shall provide in the subcontract for the Owner to receive the same audit rights with regard to the Subcontractor as the Owner receives with regard to the Contractor in Article 11.

## **ARTICLE 11 ACCOUNTING RECORDS**

The Contractor shall keep full and detailed records and accounts related to the Cost of the Work, and exercise such controls, as may be necessary for proper financial management under this Contract and to substantiate all costs incurred. The accounting and control systems shall be satisfactory to the Owner. The Owner and the Owner's auditors shall, during regular business hours and upon reasonable notice, be afforded access to, and shall be permitted to audit

and copy, the Contractor's records and accounts, including complete documentation supporting accounting entries, books, job cost reports, correspondence, instructions, drawings, receipts, subcontracts, Subcontractor's proposals, Subcontractor's invoices, purchase orders, vouchers, memoranda, and other data relating to this Contract. The Contractor shall preserve these records for a period of three years after final payment, or for such longer period as may be required by law.

## ARTICLE 12 PAYMENTS

### § 12.1 Progress Payments

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

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

« »

§ 12.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » ( « » ) days after the Architect receives the Application for Payment.

*(Federal, state or local laws may require payment within a certain period of time.)*

§ 12.1.4 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

§ 12.1.5 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Guaranteed Maximum Price among: (1) the various portions of the Work; (2) any contingency for costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order; and (3) the Contractor's Fee.

§ 12.1.5.1 The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. The schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 12.1.5.2 The allocation of the Guaranteed Maximum Price under this Section 12.1.5 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.

§ 12.1.5.3 When the Contractor allocates costs from a contingency to another line item in the schedule of values, the Contractor shall submit supporting documentation to the Architect.

§ 12.1.6 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. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work and for which the Contractor has made payment or intends to make payment prior to the next Application for Payment, by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 12.1.7 In accordance with AIA Document A201-2017 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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

- .1 That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;
- .2 That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and
- .4 The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 12.1.7.1.1 and 12.1.7.1.2 at the rate stated in Section 5.1.1 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 12.1.7.1.1 and 12.1.7.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

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

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017;
- .5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 12.1.4 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and
- .6 Retainage withheld pursuant to Section 12.1.8.

#### § 12.1.8 Retainage

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

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

« »

§ 12.1.8.1.1 The following items are not subject to retainage:

*(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)*

« »

§ 12.1.8.2 Reduction or limitation of retainage, if any, shall be as follows:

*(If the retainage established in Section 12.1.8.1 is to be modified prior to Substantial Completion of the entire Work, insert provisions for such modification.)*

« »

§ 12.1.8.3 Except as set forth in this Section 12.1.8.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 12.1.8. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

*(Insert any other conditions for release of retainage, such as upon completion of the Owner's audit and reconciliation, upon Substantial Completion.)*

« »

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

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

§ 12.1.11 The Owner and the Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors, and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

§ 12.1.12 In taking action on the Contractor’s Applications for Payment the Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor, and such action shall not be deemed to be a representation that (1) the Architect has made a detailed examination, audit, or arithmetic verification, of the documentation submitted in accordance with Section 12.1.4 or other supporting data; (2) that the Architect has made exhaustive or continuous on-site inspections; or (3) that the Architect has made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner’s auditors acting in the sole interest of the Owner.

## § 12.2 Final Payment

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

- .1 the Contractor has fully performed the Contract, except for the Contractor’s responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work and a final Application for Payment; and
- .3 a final Certificate for Payment has been issued by the Architect in accordance with Section 12.2.2.

§ 12.2.2 Within 30 days of the Owner’s receipt of the Contractor’s final accounting for the Cost of the Work, the Owner shall conduct an audit of the Cost of the Work or notify the Architect that it will not conduct an audit.

§ 12.2.2.1 If the Owner conducts an audit of the Cost of the Work, the Owner shall, within 10 days after completion of the audit, submit a written report based upon the auditors’ findings to the Architect.

§ 12.2.2.2 Within seven days after receipt of the written report described in Section 12.2.2.1, or receipt of notice that the Owner will not conduct an audit, and provided that the other conditions of Section 12.2.1 have been met, the Architect will either issue to the Owner a final Certificate for Payment with a copy to the Contractor, or notify the Contractor and Owner in writing of the Architect’s reasons for withholding a certificate as provided in Article 9 of AIA Document A201–2017. The time periods stated in this Section 12.2.2 supersede those stated in Article 9 of AIA Document A201–2017. The Architect is not responsible for verifying the accuracy of the Contractor’s final accounting.

§ 12.2.2.3 If the Owner’s auditors’ report concludes that the Cost of the Work, as substantiated by the Contractor’s final accounting, is less than claimed by the Contractor, the Contractor shall be entitled to request mediation of the disputed amount without seeking an initial decision pursuant to Article 15 of AIA Document A201–2017. A request for mediation shall be made by the Contractor within 30 days after the Contractor’s receipt of a copy of the Architect’s final Certificate for Payment. Failure to request mediation within this 30-day period shall result in the substantiated amount reported by the Owner’s auditors becoming binding on the Contractor. Pending a final resolution of the disputed amount, the Owner shall pay the Contractor the amount certified in the Architect’s final Certificate for Payment.

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

« »

§ 12.2.4 If, subsequent to final payment, and at the Owner's request, the Contractor incurs costs, described in Article 7 and not excluded by Article 8, to correct defective or nonconforming Work, the Owner shall reimburse the Contractor for such costs, and the Contractor's Fee applicable thereto, on the same basis as if such costs had been incurred prior to final payment, but not in excess of the Guaranteed Maximum Price. If adjustments to the Contract Sum are provided for in Section 5.1.7, the amount of those adjustments shall be recalculated, taking into account any reimbursements made pursuant to this Section 12.2.4 in determining the net amount to be paid by the Owner to the Contractor.

### § 12.3 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 13 DISPUTE RESOLUTION

### § 13.1 Initial Decision Maker

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

« »  
« »  
« »  
« »

### § 13.2 Binding Dispute Resolution

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

*(Check the appropriate box.)*

Arbitration pursuant to Section 15 of AIA Document A201-2017

Litigation in a court of competent jurisdiction

Other *(Specify)*

« »

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

## ARTICLE 14 TERMINATION OR SUSPENSION

### § 14.1 Termination

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

### § 14.1.2 Termination by the Owner for Cause

§ 14.1.2.1 If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A201-2017, the amount, if any, to be paid to the Contractor under Article 14 of AIA Document A201-2017 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed an amount calculated as follows:

- .1 Take the Cost of the Work incurred by the Contractor to the date of termination;
- .2 Add the Contractor's Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 5.1.1 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;
- .3 Subtract the aggregate of previous payments made by the Owner; and



- .4 Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A201–2017.

§ 14.1.2.2 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 14.1.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 14, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders.

§ 14.1.3 Termination by the Owner for Convenience

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

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

« »

§ 14.2 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017; in such case, the Guaranteed Maximum Price and Contract Time shall be increased as provided in Article 14 of AIA Document A201–2017, except that the term “profit” shall be understood to mean the Contractor’s Fee as described in Article 5 and Section 6.4 of this Agreement.

ARTICLE 15 MISCELLANEOUS PROVISIONS

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

§ 15.2 The Owner’s representative:

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

« »  
« »  
« »  
« »  
« »  
« »

§ 15.3 The Contractor’s representative:

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

« »  
« »  
« »  
« »  
« »  
« »

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

§ 15.5 Insurance and Bonds

§ 15.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A102™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the

Work Plus a Fee with a Guaranteed Maximum Price, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 15.5.2 The Contractor shall provide bonds as set forth in AIA Document A102™–2017 Exhibit A, and elsewhere in the Contract Documents.

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

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

« »

§ 15.7 Other provisions:

« »

## ARTICLE 16 ENUMERATION OF CONTRACT DOCUMENTS

§ 16.1 This Agreement is comprised of the following documents:

- .1 AIA Document A102™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A102™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013 incorporated into this Agreement.)*

« »

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 16.

.8 Other Exhibits:

*(Check all boxes that apply.)*

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

« »

[  ] The Sustainability Plan:

Title	Date	Pages

[ « » ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

« »

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

\_\_\_\_\_  
**OWNER** *(Signature)*

« »« »

\_\_\_\_\_  
*(Printed name and title)*

\_\_\_\_\_  
**CONTRACTOR** *(Signature)*

« »« »

\_\_\_\_\_  
*(Printed name and title)*

## SECTION 007200 - GENERAL CONDITIONS OF THE CONTRACT

### PART 1 - GENERAL

#### 1.1 Form

- A. The American Institute of Architects Document A201 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, 2017 Edition, contains the General Conditions of the Contract. AIA Document A201 is amended by Supplementary Conditions stated in Section 007300 - Supplementary conditions of the Contract, herein.
- B. The General Conditions of the Contract for Construction and the Supplementary Conditions of the contract shall be taken together and constitute the Conditions of the Contract reference in the Agreement.
- C. The General Conditions of the Contract for Construction and the Supplementary Conditions of the Contract are referred together in the Project Manual as the General Conditions, both are hereby made a part of this Contract as though fully contained in these specifications. No contractual adjustments shall be due or become exigent as a result of failure on the part of the Contractor to fully acquaint himself and all other parties to the Contract with the Conditions of Document A201 and the Supplementary General Conditions.

### PART 2 - PRODUCTS

NOT USED.

### PART 3 - EXECUTION

NOT USED.

END OF SECTION 007200

## SECTION 007300 - SUPPLEMENTARY CONDITIONS

### PART 1 - GENERAL

#### Document Includes

The following supplements modify, rescind, supplement, and take precedence over the General Conditions of the Contract for Construction, AIA Document A201, 2017 edition, referenced in Document 007200 - General Conditions of the Contract. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

### ARTICLE 1 - GENERAL PROVISIONS

#### **1.1.6 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS**

Add the following Sections 1.1.6.1 through 1.1.6.5 inclusive as follow:

1.1.6.1 In the Specification Sections, Part 1 – General, may include “Related Documents”, “Summary” and “Definitions” information contained in the Specifications. The listings are not intended to be inclusive. It shall be the responsibility of the Contractor to determine the full extent of Work that will be required for proper completion of the Project. No responsibility, either direct or implied, will be assumed by either the Architect or the Owner for omissions or duplications by the Contractor due to the arrangement of information in the Contract Documents. It shall be the Contractor's responsibility to properly organize and coordinate such information to accomplish the Work.

1.1.6.2 Specification Sections are written in modified brief style consistent with clarity. In general, the words "the", "shall", "will", and "all" are not used. Where such words as "perform", "provide", "install", "erect", "furnish", "connect", "test", or words of similar meaning are used, it shall be understood that such words include the meaning of the phrase "The Contractor shall". The requirements indicated and specified apply to all Work of the same kind, class and type, even though the word "all" is not stated.

1.1.6.3 Drawings are intended to show general arrangement, design and extent of Work and are partly diagrammatic. As such, they are not intended to be scaled for measurements or to serve as shop drawings.

1.1.6.4 When reference is made in the Drawings or Specifications to industry standards, or reference type specifications, or to another part of the Contract Documents, it shall have the same force and effect as if the document, or portion referenced, is exactly repeated in the place where reference is made. Refer to Section 014200 - References, in the Specifications for additional requirements.

1.1.6.5 Whenever the Drawings or Specifications, a material, component or piece of equipment is referred to in the singular, the reference shall be interpreted to apply to as many of such articles, devices and equipment as are required to complete the Work.

Add Section 1.2.3.1 as follows:

### **1.2.3.1 MISCELLANEOUS DEFINITIONS**

- .1 Where the words "equal", "approved equal", "equivalent", "satisfactory", "directed", "designated", "selected", "as required", and words of similar meanings are used, the written review, comment, acceptance, selection, or similar action of the Architect or Owner is required.
- .2 Where words "required" and words of similar meaning are used, it shall mean "as required to properly complete the Work and as required by the Architect or Owner", unless stated otherwise.
- .3 Where the words "provide" and "perform" are used, it is understood and intended to mean that the Contractor, at his expense, shall furnish and install the Work, complete in place and ready for use, including furnishing of necessary labor, materials, tools, equipment and transportation. These definitions apply the same to future, present and past tenses, except the word "provided" may mean "contingent upon" where such is the context.

### **1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE**

Add Section 1.5.3 as follows:

1.5.3 The Contractor will be furnished free of charge one (1) copy of each set of Drawings and Specifications as accepted for building permit issue by the permit authority having jurisdiction for the purpose of construction of the Work. Additional copies may be obtained by the Contractor from the Architect for the cost of reproduction, shipping and handling.

### **1.7 DIGITAL DATA USE AND TRANSMISSION**

Delete this section in its entirety and replace with the following:

“The Architect may, at its discretion, provide digital files for use in the preparation of shop drawings. The Architect or their consultants make no representation that the digital

files are accurate or appropriate for use for any purpose by the Contractor and the Contractor agrees that the use of those digital files is at their own risk.”

### **ARTICLE 3 – CONTRACTOR**

#### **3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR**

Add Section 3.2.5 as follows:

- 3.2.5 In order that any lack of clear definition of the Work, or conflicts in the Contract Documents, be identified and resolved prior to the start of construction activities, the Contractor shall submit a written report to the Architect and/or Owner within fifteen (15) days after award of Contract by the Owner. This report shall include the following statement:

"[INSERT **Contractor's name**] hereby certifies that the Drawings and Specifications for the Project have been carefully examined and sufficient time has been provided to prepare the Contract Sum. [INSERT **Contractor's name**] further warrants that to the extent that any of the provided Contract Documents required clarification in any respect, such clarification has been obtained from the Architect in writing and [INSERT **Contractor's name**] is satisfied with such responses. It is understood that the Contract Documents contemplate a finished Project of such character and quality as is described in or is reasonable inferable from them. Recognizing the impossibility of producing Drawings and Specifications with perfect accuracy, [INSERT **Contractor's name**] agrees that the Contract Time and Sum for the Work includes sufficient time (including rain delays) and cost allowances to make the Work complete and in compliance with good practice and the design intent". Contractor claims for delay due to weather conditions will not be considered or accepted.

#### **3.4 LABOR AND MATERIALS**

Section 3.4.1: Add the following Subparagraphs to the Section:

- .1 The Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the manufacturers or products identified in the Contract Documents and, where applicable or required, the name of the installing subcontractor or supplier.
- .2 The Owner will reply in writing to the Contractor if there are any reasonable objections to the manufacturer or products specified. If adequate data on any proposed manufacturer or installer is not available, the Owner may state that

action will be deferred until the Contractor provides further data. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

Section 3.4.2: Add the following Subparagraphs to the Section:

- .1 After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products for those specified only under the conditions provided by Division 01 – General Requirements.
- .2 By making a request for substitutions, the Contractor:
  - .a represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
  - .b represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
  - .c certifies that the cost data presented is complete and includes all related costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
  - .d will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

### **3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS**

Add the following Subparagraphs 3.7.1.1 through 3.7.1.5 to Section 3.7.1:

- .1 The Owner will pay for building plan review fees, utility deposits, environmental fees, and impact fees.
- .2 The Contractor will pay for all other fees including but not limited to: Utility connection fees, subcontractor permit fees, utility meter fees, etc.
- .3 The Contractor shall include in Contract Sum all administrative costs involved in obtaining various permits and processing other fees that are the responsibility of the Contractor.
- .4 The Contractor shall further secure and pay for all other licenses and inspections necessary for execution of the Work.



- .5 The Contractor shall obtain necessary information, apply for and deliver the payments for all fees paid by the Owner.

### **3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES**

In Section 3.10.2, lines 2 and 3, change "approval" in one (1) location each to "review".

### **3.11 DOCUMENTS AND SAMPLES AT THE SITE**

In Section 3.11, line 3, change "approved" in one (1) location to "reviewed".

In Section 3.11 change the period at the end of the paragraph to a comma and add the following:

....., "except as otherwise modified by Division 01 – General Requirements."

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

In Section 3.12.5, line 3, change "approved" in two (2) locations to "accepted".

In Section 3.12.7, line 3, change "approved" in one (1) location to "reviewed".

In Section 3.12.8, line 1, change "approved" in one (1) location to "accepted".

In Section 3.12.8, lines 2 and 7, change "approval" in one (1) location in each referenced line to "review".

In Section 3.12.8, line 4, change "approval" to "acceptance" in one (1) location.

In Section 3.12.9, line 3, change "approval" in one (1) location to "review".

In Section 3.12.10, line 16, change "approve" in one (1) location to "indicate no exceptions taken".

Add Section 3.12.11 as follows:

3.12.11 Procedures for submittals are further delineated in Division 01, General Requirements.

### **3.15 CLEANING UP**

Add Section 3.15.3 as follows:

- 3.15.3 The Contractor, as a minimum requirement, and as defined by the Contract Documents, and including but not limited to, shall wash and polish all glass, remove all stains, paint stops, fingerprints, soil and dirt from finished surfaces, clean and polish hardware and fixtures, wash all unpainted concrete, masonry and tile, and leave the building broom clean.

## **ARTICLE 4 – ARCHITECT**

### **4.1 GENERAL**

In Subparagraph 4.1.2, delete the text in it's entirety, replace with " The duties, responsibilities and limitations of authority of the Architect will be as agreed in the Owner Architect Agreement where it may be in conflict with this document."

### **4.2 ADMINISTRATION OF THE CONTRACT**

In Section 4.2.3, line 2, change "known" in one (1) location to "observed".

#### **4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION**

In Section 4.2.5, line 2, change "certify" in one (1) location to "comment on".

In Section 4.2.7, line 1, change "approve" in one (1) location to "comment".

In Section 4.2.7, line 4, change "approved" in two (2) locations to "accepted".

In Section 4.2.7, line 10, change "approval" in one (1) location to "acceptance or endorsement".

In Section 4.2.7, line 12, change "approval" in two (2) locations to "acceptance".

In Section 4.2.8, line 1, delete the words "Change Orders and" in one (1) location.

In Section 4.2.8, line 2, change "investigate" in one (1) location to "observe".

In Section 4.2.8, line 2, delete the words "determinations and".

In Section 4.2.9, line 1, change "inspections" in one (1) location to "observations".

In Section 4.2.9, line 4, change "issue" in one (1) location to "review".

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

## **6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS**

Add Section 6.1.5 and subparagraphs as follows:

6.1.5 The Owner reserves the right to take possession and use any completed or partially complete portion of the building prior to completion providing such possession or use does not interfere with the Contractor's accomplishment of the Work. Such partial occupancy or taking possession will be based on the following:

- .1 Occupancy of any portion of the Work will not constitute an acceptance of the Work not performed in accordance with Contract Documents or relieve the Contractor of liability to perform Work required by the Contract, but not completed at the time of occupancy.
- .2 Immediately prior to any partial occupancy, the Contractor, Owner, and Architect shall make a thorough joint observation of the portion of the Work affected and mutually agree upon the conditions of occupancy and status of the Work. The Architect's evaluation shall be final in determining responsibility at the time of observations for the conditions resulting from said occupancy. Damage to the building caused by the Owner, his representative or occupants before Final Acceptance will be the responsibility of the Owner.

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

### **7.1 GENERAL**

Add the following Subparagraph to Section 7.1.1.

7.1.1.1 Procedures and administrative requirements for changes in the work are further specified in Division 01 – General Requirements.

### **7.2 CHANGE ORDERS**

In Section 7.2.1, line 1, replace “Architect” in one (1) location with “Contractor”.

Add Section 7.2.2 as follows:

7.2.2 Reasonable allowances for overhead and profit shall be included at the rates as negotiated and referenced in the Agreement.

### **7.3 CONSTRUCTION CHANGE DIRECTIVES**

In Section 7.3.8, line 2, replace “confirmed” in one (1) location with “substantiated by the Contractor to the acceptance of the Owner and review.”

In Section 7.3.9, line 3, replace “certification” in one (1) location with “review of the Contractor’s provided application”.

In Section 7.3.9, line 4, replace “certify” in one (1) location with “accept”.

In Section 7.3.10, line 3, replace “Architect” in one (1) location with “Contractor”.

## **ARTICLE 8 – TIME**

### **8.2 PROGRESS AND COMPLETION**

Add the following Section 8.2.4:

8.2.4 The Contractor will not be entitled to additional compensation for Work performed outside of regular working hours, except as authorized in advance and in writing by the Owner.

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

Add the following to the end of Section 8.3.1:

“Inclement weather shall not be cause to justify delay, except for Tropical Storms or Hurricanes for their official recorded impact at the project site.”

## **ARTICLE 9 - PAYMENTS AND COMPLETION**

### **9.3 APPLICATIONS FOR PAYMENT**

Add the following to the end of Section 9.3.1:

“Requirements for the Application for Payment shall be as specified in Division 01 – General Requirements.”

Add the following Subparagraph 9.3.1.3 to Section 9.3.1:

9.3.1.3 The first Application for Payment shall be accompanied, in writing, by the Contractor's conditional partial waiver of lien, for the amount due. Each subsequent Application for Payment shall be accompanied, in writing, by the Contractor's partial waiver of lien for

the current and unconditional waiver for previous payment amount due and by unconditional partial waivers of lien from all subcontractors and supplies of materials, equipment and services who are included in the preceding Application for Payment. Application for Final Payment shall be accompanied by the Contractor's full waiver of lien for the amount due and by full waivers of lien from subcontractors and suppliers of materials, equipment and services who have not previously furnished such full waivers.

Add the following Subparagraph 9.3.1.4 to Section 9.3.1.

9.3.1.4 Until Substantial Completion, the Owner shall pay no more than ninety **(90) percent** of the amount due the Contractor on account of progress payments.

Add the following Subparagraph 9.3.1.5 to Section 9.3.1.

9.3.1.5 After the Work is substantially complete and the Architect has determined that the Contractor's list of items to be completed or corrected is acceptable, retainage shall be adjusted to be in proportion to the value of Work on the list, plus unsettled claims.

#### **9.4 CERTIFICATES FOR PAYMENT**

In Section 9.4, delete "CERTIFICATES FOR PAYMENT" and replace with "REVIEW OF CONTRACTOR'S APPLICATION FOR PAYMENT".

In Section 9.4.1, line 2, change "a Certificate for Payment" in one (1) location to "an acceptance of the Contractor's Application for Payment".

In Section 9.4.1, line 4, change "certification" in one (1) location to "acceptance".

In Section 9.4.2, line 1, change "a Certificate for Payment" in one (1) location to "an acceptance of the Contractor's Application for Payment".

In Section 9.4.2, line 7, change "a Certificate for Payment" in one (1) location to "an acceptance of the Contractor's Application for Payment".

In Section 9.4.2, line 8, change "certified" in one (1) location to "accepted".

In Section 9.4.2, line 9, change "a Certificate for Payment" in one (1) location to "an acceptance of the Contractor's Application for Payment".

In Section 9.4.2, line 10, change "inspections" in one (1) location to "observations".

In Section 9.4.2, line 12, change "made examination" in one (1) location to "reviewed".

#### **9.5 DECISIONS TO WITHHOLD CERTIFICATION**

In Section 9.5, delete “CERTIFICATION” in one (1) location and replace with “ACCEPTANCE”.

In Section 9.5.1, line 1, change “a Certificate for Payment” in one (1) location to “an acceptance of the Contractor’s Application for Payment”.

In Section 9.5.1, line 3, change “certify” in one (1) location to “accept”.

In Section 9.5.1, line 5, change “a Certificate for Payment” in one (1) location to “an acceptance of the Contractor’s Application for Payment”.

In Section 9.5.1, line 6, change “a Certificate for Payment” in one (1) location to “an acceptance of the Contractor’s Application for Payment”.

In Section 9.5.1, line 7, change “a Certificate for Payment” in one (1) location to “an acceptance of the Contractor’s Application for Payment”.

In Section 9.5.2, line 1, change “certification” in one (1) location to “acceptance”.

In Section 9.5.3, line 1, change “certification” in two (2) locations to “acceptance”.

## **9.6 PROGRESS PAYMENTS**

In Section 9.6.1, line 1, change “issued a Certificate for Payment” in one (1) location to “accepted the Contractor’s Application for Payment”.

In Section 9.6.6, line 1, change “a Certificate for Payment” in one (1) location to “An acceptance of the Contractor’s Application for Payment”.

## **9.7 FAILURE OF PAYMENT**

In Section 9.7, line 1, change “a Certificate for Payment” in one (1) location to “An acceptance of the Contractor’s Application for Payment”.

In Section 9.7, line 3, change “certified” in one (1) location to “accepted”.

## **9.8 SUBSTANTIAL COMPLETION**

In Section 9.8.3, line 1, replace “make an inspection” with “visit the Project to observe and”

In Section 9.8.3, line 2, replace “inspection” in one (1) location with “observations”.

In Section 9.8.3, line 6, replace “inspection” in one (1) location with “site visit and observation.”

In Section 9.8.4, lines 5 and 6, revise the following:

Delete the following sentence:

“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.”

Replace with the following sentence:

“The Contractor’s comprehensive 1 yr. warranty and all other warranties required or provided by the Contract Documents shall commence on the date of the Owner’s written acceptance of the work or portion thereof, unless otherwise agreed upon in writing.”

## **9.9 PARTIAL OCCUPANCY OR USE**

In Section 9.9.2, line 1, replace “inspect” in one (1) location with “observe”.

## **9.10 FINAL COMPLETION AND FINAL PAYMENT**

In Section 9.10.1, lines 1, 2, replace “inspection” in one (1) location, each line, with “observation”.

In Section 9.10.1, line 4, replace “issue a Final Certificate for Payment” in one (1) location with “review the Contractor’s final Application for Payment”.

In Section 9.10.1, line 4, replace “issue a Final Certificate for Payment stating that to the best of the Architect’s knowledge” with “review the Contractor’s Final Application for Payment considering that to the extent of the Architect’s knowledge, available”.

In Section 9.10.1, line 5, replace “inspections” in one (1) location with “observations”.

In Section 9.10.1, line 7, replace “Certificate” in one (1) location with “Application for Payment”.

In Section 9.10.1, line 7, replace “Final Certificate for Payment” in one (1) location with “acceptance of the Contractor’s Final Application for Payment”.

Add the following sentence to Section 9.10.1:

“The payment amount conveyed by the accepted Contractor’s final Application for Payment shall be sufficient to increase the total payments to 100 percent of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims.

Add the following Subparagraph 9.10.2.1 to Section 9.10.2:

9.10.2.1 In addition to the above, the following requirements shall be fulfilled before application for final payment or payment of the retained percentages is accepted and paid: The Contractor shall deliver to the Architect (for delivery to the Owner), in a single package, properly labeled item by item, to indicate all materials, equipment and documents contained therein the following;

- (1) Notice by the Contractor of satisfactory completion of Work including corrections of defective Work and acceptance of same by the Architect,
- (2) Contractor's Affidavit of Payment of Debtors and Claims; AIA Document G706 and Contractor's Affidavit of Release of Liens, AIA Document G706A, or other forms as directed or accepted by the Owner.
- (3) Submission to the Owner of required Project Record Documents as defined in Division 01 - General Requirements.
- (4) Completion of any required instructions and training to the Owner on operation and maintenance of all equipment and systems.
- (5) Submission of all tools which are a permanent part of equipment installed in the work.
- (6) Submission of all keys, construction and permanent, properly identified.

In Section 9.10.3, lines 3 and 8, replace "certification" in one (1) location, in each referenced line, with "review".

Add Section 9.10.6 as follows:

9.10.6 Following the issuance of final payment the Owner will record a Notice of Completion with the governmental authorities having jurisdiction within ten (10) days following completion and acceptance by the Owner of all work in accordance with the Contract Documents. The Notice of Completion replaces any Certificate(s) of Substantial Completion.

Add Section 9.11 as follows:

## **9.11 LIQUIDATED DAMAGES**



9.11.1 The Contractor and Contractor's surety, if any, shall be liable for and shall pay the Owner the sums stipulated in the Agreement as liquidated damages, in lieu of actual damages, for each calendar day of delay until Substantial Completion.

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

### **10.2 SAFETY OF PERSONS AND PROPERTY**

Add the following to the end of Section 10.2.1:

. . . . This requirement shall apply continuously and not be limited to normal working hours.

Add the following Section 10.2.2.1 to Section 10.2.2:

10.2.2.1 The Contractor, its agents, employees, materialmen and subcontractors will perform all work on the project in a safe and responsible manner. The Contractor shall, at its own expense, conform to the safety policies and regulations established by the Contractor and shall comply with all specific safety requirements promulgated by all government authorities including without limitation the requirements of the Occupational Safety and Health Act, and the Construction Safety Act, in effect on the date of the Agreement and all standard and regulations which have been or shall be promulgated by the parties or agencies which administer the Acts. The Contractor shall comply with said requirements, standards and regulations, and require and be directly responsible for compliance therewith on the part of its said agents, employees, materialmen, and subcontractors; and shall directly receive, respond to, defend, and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of its failure on the part of its agents, employees, materialmen or subcontractors to so comply.

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

### **11.1 CONTRACTOR'S LIABILITY INSURANCE**

Add the following Section 11.1.1.1:

11.1.1.1 The Contractor shall obtain and maintain, for the full period of the Contract, the following minimum coverage and limits, or coverage and limits that are required by the Owner or by law, whichever is greater:

- .1 WORKER'S COMPENSATION including Occupational Disease insurance meeting the statutory requirements of the jurisdiction of the Project together with a Broad Form All States Endorsement and containing Employers' Liability insurance in an amount of at least \$1,000,000 and as required by Florida Law.

- .2 COMPREHENSIVE GENERAL LIABILITY AND/OR UMBRELLA LIABILITY insurance on an occurrence basis provided limits for Bodily Injury with Personal Injury including its employees of in the amounts of at least \$10,000,000 each occurrence and \$10,000,000 aggregate; Property Damage \$10,000,000 each occurrence, \$10,000,000 aggregate. The policy must include the Owner, Architect and other Project Consultants as listed in the Project Directory, as ADDITIONAL INSUREDS and must provide Premises-Operations, Independent Contractors, Broad Form Property Damage, Contractual Liability, Products and Completed Operations coverage's (which shall be maintained in force for a period of two years after substantial completion of the project or for such longer period of time as is described in the Contract Documents) and PRIMARY to any insurance of the ADDITIONAL INSUREDS. XCU Exclusions must be deleted when applicable to operations performed by the Contractor. A waiver of Subrogation in favor of the Owner shall also be included. Evidence of Insurance coverage naming the additional insureds shall be provided to the Owner and Architect prior to proceeding with the work.
- .3 COMPREHENSIVE AUTOMOBILE LIABILITY on an occurrence basis covering all Owned, Non-Owned and Hired Vehicles for limits of liability equal to those in (.2) above.
- .4 A certificate of insurance on an approved form must be delivered to the Owner and Architect and must state coverage will not be altered, canceled or allowed to expire without thirty (30) days written notice by registered mail to the Owner.
- .5 Insurance coverage of \$1,000,000.00 minimum limit must be obtained from each subcontractor and, or, supplier, if any, before permitting them on the site of the project. Otherwise, this required protection must be included within the Contractor's insurance policies.
- .6 It is understood and agreed that the insurance coverages and limits required above shall not limit the extent of the Contractor's responsibilities and liabilities specified within the Contract Documents or by law.
- .7 It is understood and agreed authorization is hereby granted to Owner to withhold payments to the Contractor until properly executed Certificate(s) of Insurance evidencing insurance required herein are received by the Owner.
- .8 Certificates of insurance shall be submitted as specified in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.

### **11.3 PROPERTY INSURANCE**

Add the following to the end of Section 11.2.1.1

“The Contractor shall be responsible for any damage or loss not covered under the Owner's policy to any and all materials, supplies or equipment after delivery to the site by the Contractor or his suppliers, whether paid for by the Owner or not, whether prior to or after installation into the building structure. (Examples: theft, damage while handling, etc..)”

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

Add Section 11.1.5 as follows:

11.1.5 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

Add Section 11.1.6 as follows:

11.1.6 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.

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

#### **12.1 UNCOVERING OF WORK**

In Section 12.1.1, line 3, change “examination” in one (1) location to “observation”.

In Section 12.1.2, line 1, change “examine” in one (1) location to “observe it”.

In Section 12.2.1, line 1, change “rejected” in one (1) location to “not accepted”.

### **ARTICLE 13 - MISCELLANEOUS PROVISIONS**

#### **13.5 INTEREST**

In Section 13.5, line 1, following “unpaid” insert “after 30 days after the due date”.

### **ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT**

#### **14.1 TERMINATION BY CONTRACTOR**

In Section 14.1.1.3, line 1, change “issued a Certificate for Payment” in one (1) location to “accepted the Contractor’s Final Application for Payment”.

In Section 14.1.1.3, line 2, change “certification” in one (1) location to “acceptance”.

In Section 14.1.1.3, line 3, change “or” in one (1) location to “or the Contractor has not provided required or requested supporting documents including satisfaction of requirements of the Owner related to the Owner’s financing resource or Lender for the Project”.

## **14.2 TERMINATION BY THE OWNER FOR CAUSE**

In Section 14.2.2, line 1, change “certification” in one (1) location to “acceptance”.

In Section 14.2.4, line 5, change “certified” in one (1) location to “accepted”.

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

### **15.1 CLAIMS**

#### **15.1.4 CONTINUING CONTRACT PERFORMANCE**

In Section 15.1.4.2, line 3, change “Certificates for Payment” in one (1) location to “the Contractor’s Application for Payment”.

### **15.2 INITIAL DECISION**

In Section 15.2.2, line 3, change “reject” in one (1) location to “not accept”.

In Section 15.2.2, line 3, change “approve” in one (1) location to “accept”.

In Section 15.2.4, line 5, change “reject or approve” in one (1) location to “accept or not accept”.

In Section 15.2.5, line 1, change “approving or rejecting” in one (1) location to “accepting or not accepting”.

END OF SECTION 007300

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Purchase contracts.
4. Owner-furnished products.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and drawing conventions.

B. Related Section:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Veve at Arbor Green Apartments

1. Project Location: Alachua County, near the corner of Newberry Road and NW 136<sup>th</sup> Street
2. Owner: Quivet Creek Development, LLC  
800 Highlands Ave.  
Suite #200  
Orlando, FL 32803  
Agent: Mike Harmon  
mharmon@qcdevelopment.com  
863-289-9757
3. Architect: Fugleberg Koch, LLC  
2555 Temple Trail

Winter Park, FL 32789

Architect's Representative: James E. Kelley, Jr. AIA

B. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents: Other Owner Consultants:

1. Structural Engineers: Advanced Structural Design  
1265 S. Semoran Blvd.  
Suite 1201  
Winter Park, FL 32792
2. MEP Engineers: MiGre Engineers LLC  
155 East Wildmere Ave.  
Suite 1021  
Longwood, FL 32750

C. Owner Consultants: The Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Civil Engineer: CHW Engineers  
11801 Research Drive, Alachua, FL 32615  
(352) 331-1976
2. Landscape Architect: Foster Conant & Associates, Inc.  
120 West Robinson Street  
Orlando, FL 32801  
(407) 648-2225
3. Interior Designer: R Shana Designs, Inc.  
1958 Filly Trail  
Oviedo, FL. 32765

D. Project Description:

The Work of the Project is defined by the Contract Documents Dated 9/11/2018, Specifications dated 9/11/2018 and as may be amended and consists of the following:

The Project consists of the construction of a new multi-family residential rental apartment community in Alachua County, Florida. The Project may have two General Contractors: One for the residential buildings and another General Contractor for the Clubhouse and amenity buildings. The project has a total of (255) apartment units arranged in four building types. The buildings are wood frame construction, sprinklered and (3) stories in height. The project will sit

on post tensioned and conventional foundations. The Project will include Civil Engineering/Sitework, Landscape / irrigation / hardscape and Interior Design work, drawings provided direct by Owner.

#### 1.4 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
  - 1. **<Insert a brief description of work performed by Owner>.**
- C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.
  - 1. **<Insert a brief description of work performed by Owner>.**
- D. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.
  - 1. **<Insert a brief description of work performed by Owner>.**

#### 1.5 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Preceding Work: Owner **[has awarded]** **[will award]** separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before Work under this Contract begins.
  - 1. **<Insert name of the Contract>: To <Insert name of separate Contractor> [to] [for] <Insert a brief description of work performed under separate contract>.**
- C. Concurrent Work: Owner **[has awarded]** **[will award]** **[and will assign to Contractor]** separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
  - 1. **<Insert name of the Contract>: To <Insert name of separate Contractor> [to] [for] <Insert a brief description of work performed under separate contract>.**

D. Subsequent Work: Owner [**has awarded**] [**will award**] separate contract(s) for the following additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. **<Insert name of the Contract>**: To **<Insert name of separate Contractor>** [to] [for] **<Insert a brief description of work performed under separate contract>**.

#### 1.6 PURCHASE CONTRACTS

A. General: Owner may negotiate purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner will assign these purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise noted.

1. Contractor's responsibilities are same as if Contractor had negotiated purchase contracts, including responsibility to renegotiate purchase and to execute final purchasing agreements.

#### 1.7 OWNER-FURNISHED PRODUCTS

A. Owner may furnish products required for the Project. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

B. Owner-Furnished Products:

1. Owner and Contractor will negotiate and provide an agreed list of products and related assigned responsibilities for Owner-Furnished products to be provided for the Project.

#### 1.8 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to Contract limits defined by Owner.

C. Condition of Existing Buildings: This project is the partial build out within an existing operational apartment site. Care must be taken to protect the existing tenant's property and to prevent damage to the existing buildings and sitework. Where the site is damaged by construction activities, it shall be repaired as a part of this scope of work without a change in project scope or cost.



#### 1.9 COORDINATION WITH OCCUPANTS

- A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
  2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
  3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
  4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

#### 1.10 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, except as otherwise indicated by the regulations and criteria established by the authorities having jurisdiction, or to hours stipulated by Owner Contractor Agreement. The most restrictive limits on allowable work hours shall apply.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Owner not less than two (2) days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than two (2) days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building: Smoking is not permitted within the building or within (25) feet of entrances, operable windows, or outdoor air intakes without the written consent of the Owner.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

## SECTION 012100 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.

#### 1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's or Owner's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect or Owner from the designated supplier.

#### 1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

- D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### 1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

#### 1.6 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials selected by Architect, or Owner, under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Architect, or Owner, under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, or Owner, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

#### 1.7 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES-Labor and Material

- A. *Wall tile in public bathrooms - \$65.00/LF. to include 48" high wainscot and 3x12" bullnose base.*
- B. *Wall tile in unit bathrooms. - \$4.02/SF. for 12"x24" wall tile*
- C. *Floor tile in Public bathrooms - \$5.76/SF. for 6"x24" floor tile*
- D. *Floor tile in unit bathrooms - \$5.76/SF. for 6"x24" floor tile*
- E. *Floor LVT (with or without attached sound mat) for units - \$2.00/SF. without Soundmat, \$3.15/SF. with Soundmat*
- F. *Floor LVT for common areas on ground level - \$2.00/SF. without Soundmat, \$3.15/SF. with Soundmat*
- G. *Carpet in public area spaces - \$25.00/SY*
- H. *Carpet in hallways - \$25.00/SY*
- I. *Cabinet marble tops in units – Cabinets included as \$2,332/Unit, tops included as builders grade granite at \$809.0/Unit, these are minimums to allow, increase if required.*
- J. *Marble for all window sills - \$7.50/LF.*

END OF SECTION 012100

## SECTION 012300 - ALTERNATES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

#### 1.3 DEFINITIONS

- A. Alternate: An amount proposed by Contractor and stated and defined within the Owner/Contractor Agreement for certain work that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

#### 1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.

- D. Schedule: Provide a schedule of alternates including references to Specification Sections and other Contract Documents to define requirements for materials necessary to achieve the work described under each alternate.

1.5 ADJUSTMENT OF ALTERNATES

- A. Alternate Adjustment: For alternates accepted following the establishment of the Contract Sum and schedule criteria by the Owner/Contractor Agreement, prepare a Change Order Proposal detailing any differences between the established Contract Sum and schedule and the accepted alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012300

## SECTION 012500 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. The Owner has included many specified products that are part of their company project specifications for their ability to maintain their projects and provide similar quality. Do not assume a product will be substituted for those Owner specified products. Substitutions will be accepted at the Owner's sole discretion.

#### 1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use form acceptable to Architect.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific



- features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - h. Research reports evidencing compliance with building code and regulations in effect for Project, from an evaluation organization acceptable to the authorities having jurisdiction.
  - i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery. Identify use of available float, if any, in schedule comparison.
  - j. Cost information, including a proposal of change, if any, in the Contract Sum.
  - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fourteen (14) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later, unless Architect is unable to accept the substitution as presented.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. For a Substitution for Convenience: Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated, the review of a substitution will not be considered cause for project schedule delay.

#### 1.4 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of the accepted substitutions.

### PART 2 - PRODUCTS

#### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than ten (10) days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - b. Substitution request is fully documented and properly submitted.
  - c. Requested substitution will not adversely affect Contractor's construction schedule.
  - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - e. Requested substitution is compatible with other portions of the Work.
  - f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
  - i. Owner has directed Architect to review Contractor's request for substitution.
  
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within sixty (60) days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
  1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require extensive revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - d. Owner has directed Architect to review Contractor's request for substitution.
    - e. Substitution request is fully documented and properly submitted.
    - f. Requested substitution will not adversely affect Contractor's construction schedule.
    - g. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - h. Requested substitution is compatible with other portions of the Work.
    - i. Requested substitution has been coordinated with other portions of the Work.
    - j. Requested substitution provides specified warranty.
    - k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

## SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

#### 1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

#### 1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or fourteen (14) days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Use form acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect and Owner concurrently.

1. Include a statement outlining 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 the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time. Clearly indicate amount of available float used.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

#### 1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Contractor will issue a Change Order for review and signature by Owner and Architect on AIA Document G701.

#### 1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time and implementation prerequisite requirements as may be applicable.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract as directed by the Construction Change Directive requirements in the format of a Proposed Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

## SECTION 012900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

#### 1.2 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### 1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Contractor's Construction Schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date but no later than thirty (30) days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments provide sub-schedules showing values correlated with each phase of payment.
  - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work provide subschedules showing values correlated with each element.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.

- e. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Change Orders (numbers) that affect value.
  - d. Dollar value and Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts as appropriate. For multiple building projects, provide breakdown by building and by floor.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed and only in the event that stored materials are eligible for payment by the Owner/Contractor Agreement.
  - a. Differentiate between items stored on-site and items stored off-site. For items stored off-site, include evidence of insurance, bill of sale and contractor/supplier affidavit in form acceptable to Architect.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the schedule of values before the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
  1. Submit draft copy of Application for Payment seven (7) days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
  1. Architects Certificate for Payment: The Architects Certificate for Payment section of AIA Document G702 is deleted and replaced with the following:

**ARCHITECTS REVIEW OF APPLICATION FOR PAYMENT**

**In accordance with the Contract Documents, based on on-site observations and data comprising this application, the Architect confirms to the Owner that to the best of the Architect's knowledge, information and belief the work has progressed as indicated and the Contractor is entitled to payment of the amount requested.**

**Amount:** \$ \_\_\_\_\_

**Architect:** \_\_\_\_\_

**By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**The AMOUNT noted above is payable only to the Contractor named herein. Issuance, payment and acceptance are without prejudice to any rights of the Owner or Contractor under this Contract.**

**Owner:** \_\_\_\_\_

**By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

2. Signature of acceptance by Owner is required to accept and authorize payment to Contractor.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  1. Entries shall match data on the schedule of values and Contractor's construction schedule. Provide updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.



3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full and final waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Products list (preliminary if not final).
  5. Submittal schedule (preliminary if not final).
  6. List of Contractor's staff assignments.
  7. List of Contractor's principal consultants.
  8. Copies of building permits.
  9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  10. Initial progress report.
  11. Report of preconstruction conference.
  12. Certificates of insurance and insurance policies.
  13. Performance and payment bonds.
  14. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After issuance of Certificate of Substantial Completion, submit a Contractor's Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

3. Include documentation supporting Contractor's request for any reduction in retainage amounts.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. AIA Document G707A, "Consent of Surety to Reduction in or Partial Release of Retainage."
  8. Evidence that all claims have been settled.
  9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  10. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Administrative and supervisory personnel.
  - 3. Requests for Information (RFIs).
  - 4. Project Web site.
  - 5. Project meetings.

#### 1.2 DEFINITIONS

- A. RFI: Request from Contractor seeking information from Architect during construction.

#### 1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors as applicable, if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors as applicable, to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Startup and adjustment of systems.

#### 1.4 KEY PERSONNEL

- A. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### 1.5 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect directly by other entities controlled by Contractor with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.

13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
  - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or a Software-generated form with substantially the same content as indicated above, acceptable to Architect.
  1. Identify each page of any attachments to an RFI with the RFI number and sequential page number. Submit in PDF format.
  2. Attachments to electronic RFI files will be in a format acceptable to Architect and Owner. Where color or texture selections are not required, submit in PDF format. Color and texture submittals must be actual samples.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
  1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information from Contractor.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, Contractor will notify Architect and Owner in writing within two (2) days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within two (2) days if Contractor disagrees with response.
- F. Maintain accurate and complete copies of RFI log and RFI's, including response and attachments, at the Project Site.

- G. RFI Log: Prepare, maintain, and submit monthly, concurrent with Schedule and review of Contractor's Application for Payment, a tabular log of RFIs organized by the RFI number. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related, or potential, Minor Change in the Work, Architect's Supplemental Instruction, Construction Change Directive, or Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, or Proposal Request, as appropriate.

#### 1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within seven (7) days of the meeting.

- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 (fifteen) days after execution of the Agreement.

1. Hold the conference at Project Site or another convenient location.
2. Conduct the conference to review responsibilities and personnel assignments.
3. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
4. Agenda: Discuss items of significance that could affect progress, including the following:
  - a. Tentative construction schedule.
  - b. Phasing.
  - c. Critical work sequencing and long-lead items.
  - d. Designation of key personnel and their duties.
  - e. Lines of communications.
  - f. Procedures for processing field decisions and Change Orders.

- g. Procedures for RFIs.
  - h. Procedures for testing and inspecting.
  - i. Procedures for processing Applications for Payment.
  - j. Distribution of the Contract Documents.
  - k. Submittal procedures.
  - l. Sustainable design requirements.
  - m. Preparation of record documents.
  - n. Use of the premises and existing building as applicable.
  - o. Work restrictions.
  - p. Working hours.
  - q. Owner's occupancy requirements.
  - r. Responsibility for temporary facilities and controls.
  - s. Procedures for moisture and mold control.
  - t. Procedures for disruptions and shutdowns.
  - u. Construction waste management and recycling.
  - v. Parking availability.
  - w. Office, work, and storage areas.
  - x. Equipment deliveries and priorities.
  - y. First aid.
  - z. Security.
  - aa. Progress cleaning.
  - bb. Work hours.
5. Minutes: Contractor will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: 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 Architect of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility concerns.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written recommendations.
    - n. Warranty requirements.
    - o. Compatibility of materials.

- p. Acceptability of substrates.
  - q. Temporary facilities and controls.
  - r. Space and access limitations.
  - s. Regulations of authorities having jurisdiction.
  - t. Testing and inspecting requirements.
  - u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than sixty (60) days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents (by the Contractor)
    - b. Procedures required prior to observation for Substantial Completion and for final observation for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for preparing operations and maintenance data.
    - e. Requirements for demonstration and training.
    - f. Preparation of Contractor's punch list.
    - g. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - h. Submittal procedures for closeout documentation.
    - i. Owner's partial occupancy requirements.
    - j. Installation of Owner's furniture, fixtures, and equipment.
    - k. Responsibility for removing temporary facilities and controls.
  4. Minutes: Contractor will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at a minimum of monthly intervals.



1. Coordinate dates of meetings with preparation of payment requests and Architect's Monthly Field visit.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or accept minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - 1) Review schedule for next period.
  - b. Review present and future needs of each entity present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site utilization.
    - 8) Temporary facilities and controls.
    - 9) Progress cleaning.
    - 10) Quality and work standards.
    - 11) Hazards and risks.
    - 12) Status of correction of deficient items.
    - 13) Field observations.
    - 14) Status of RFIs.
    - 15) Status of proposal requests.
    - 16) Pending changes.
    - 17) Status of Change Orders.
    - 18) Pending claims and disputes.
    - 19) Documentation of information for payment requests.
    - 20) Work hours.
    - 21) Contractor's action items.
4. Minutes: Contractor will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

## SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Construction schedule.
  - 2. Weekly Construction Reports
  - 3. Material location reports.
  - 4. Field condition reports.
  - 5. Special reports.

#### 1.2 DEFINITIONS

- A. Bar Chart Construction Schedule. At a minimum, a Gantt type bar chart schedule.
- B. Major Area: A story of construction, a separate building, or a similar significant construction element.
- C. Milestone: A key or critical point of time for reference or measurement.

#### 1.3 SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Digital copy of schedule delivered to Architect and Owner in pdf format.
- B. Weekly Construction Reports: Submit two (2) copies at weekly intervals to Owner.
- C. Material Location Reports: Submit two (2) copies at weekly intervals if other than stored at project site to Owner.
- D. Field Condition Reports: Submit two (2) copies at time of discovery of differing conditions to Architect and Owner.
- E. Special Reports: Submit three (3) copies at time of unusual event to Architect and Owner.

#### 1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

- B. Coordinate and update Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## PART 2 - PRODUCTS

### 2.1 CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
  - 1. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with Contractor's submittal schedule.
  - 3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for acceptance of Substantial Completion.
  - 4. Punch List and Final Completion: Include not more than thirty (30) days for punch list and final completion following acceptance of Substantial Completion unless otherwise accepted by Owner and Architect.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Phasing: Arrange list of activities on schedule by phase as applicable.
  - 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner as applicable.
  - 3. Owner-Furnished Products: Include a separate activity for each product as applicable. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.

4. Construction Areas: Identify each Building by level. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
  - a. Structural completion.
  - b. Permanent space enclosure and dry-in.
  - c. Completion of mechanical installation.
  - d. Completion of electrical installation.
  - e. Substantial Completion.

- D. Milestones: Include milestones as applicable, in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Recovery Schedule: When periodic update indicates the Work is fifteen (15) or more calendar days behind the current accepted schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

## 2.2 CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type Gantt construction schedule within seven (7) days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

## 2.3 REPORTS

- A. Weekly Construction Reports: Prepare a Weekly construction report recording the following information concerning events at Project site, keep reports at jobsite for review.
  1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. Equipment at Project site.
  5. Material deliveries.
  6. High and low temperatures and general weather conditions, including occurrence of inclement events.
  7. Accidents.
  8. Meetings and significant decisions.
  9. Unusual events (refer to special reports).
  10. Stoppages, delays, shortages, and losses.
  11. Meter readings and similar recordings.
  12. Emergency procedures.
  13. Orders and requests of authorities having jurisdiction.

14. Requests for inspections by the authorities having jurisdiction.
  15. Inspections provided by the authorities having jurisdiction.
  16. Change Orders received and implemented.
  17. Construction Change Directives received and implemented.
  18. Architect's Supplemental Instructions received and implemented.
  19. Services connected and disconnected.
  20. Testing of materials or assemblies.
  21. Equipment or system tests and startups.
  22. Partial completions and occupancies.
  23. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION SCHEDULE

- A. Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one (1) week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.

- B. Distribution: Distribute copies of accepted schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

## SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.
- B. Related Requirements:
  - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

#### 1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit unaltered, original, full-size image files within three days of taking photographs.
  - 1. Digital Camera: Minimum sensor resolution of (8) megapixels.
  - 2. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Date photograph was taken.
    - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- C. Construction Photographs: Submit two prints of each photographic view within (3) days of taking photographs.
  - 1. Format: 8-by-10-inch smooth-surface matte prints on single-weight, commercial-grade photographic paper; card stock to allow a 1-inch wide margin and enclosed back to back in clear plastic sleeves that are punched for standard three-ring binder.
  - 2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
    - a. Name of Project.
    - b. Name and contact information for photographer.



- c. Name of Architect.
- d. Name of Contractor.
- e. Date photograph was taken if not date stamped by camera.
- f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- g. Unique sequential identifier keyed to accompanying key plan.

### 1.3 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

### 1.4 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

## PART 2 - PRODUCTS

### 2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, with minimum size of (8) megapixels.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Photographs may be taken by Contractor staff.
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in file name for each image.
  - 2. Field Office Images: Maintain digital images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

- D. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Owner and Architect.
1. Flag construction limits before taking construction photographs.
  2. Take 20 minimum, photographs to show existing conditions adjacent to property before starting the Work.
  3. Take 20 minimum photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
- E. Periodic Construction Photographs: Take 10 minimum photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified for emergency or for clarification.
1. These photographs are not required to be professionally taken.
  2. In emergency situations, take additional photographs within 24 hours of request.
  3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Immediate follow-up when on-site events result in construction damage or losses.
    - b. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    - c. Substantial Completion of a major phase or component of the work.
    - d. As support information to respond to an RFI or other construction related clarification.

END OF SECTION 013233

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual General Requirement and Specification Sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual General Requirement and Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

#### 1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Initial Submittal: Submit concurrently with initial construction schedule. Include submittals required during the first thirty (30) days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

- a. Submit revised submittal schedule concurrently with revised updates to Contractor's construction schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal category: Action, informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Architect's final release or acceptance.

#### 1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of Drawings of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals.
  1. In the event that Architect will provide electronic copies of Drawings, Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
    - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    - b. Contractor shall execute a data licensing agreement in an Agreement form acceptable to Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on accepted submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals concurrently.
  4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action, or return without review, on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated by determination of Architect, allow twenty-one (21) days for initial review of each submittal.
  5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow fifteen (15) days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  3. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Name of subcontractor.
    - f. Name of supplier.
    - g. Name of manufacturer.
    - h. Submittal number or other unique identifier, including revision identifier.
      - 1) Submittal number shall use Specification Section number followed by a dash and then a sequential number (e.g., 061000-01-Name of submittal such as "Electrical Fixtures") followed by a brief description. Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000-01-A-Name of submittal such as "Electrical Fixtures").
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Location(s) where product is to be installed, as appropriate.
    - l. Other necessary identification.
- E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows; providing electronic submittal and file format is acceptable to Architect.
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.

- a. File name shall use project identifier and Specification Section number followed by a dash and then a sequential number, then a brief description of the submittal (e.g., 061000-01-Name of submittal such as "Electrical Fixtures"). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000-01-A-Name of submittal such as "Electrical Fixtures").
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Include the following information on an inserted cover sheet:
  - a. Project name.
  - b. Date.
  - c. Name and address of Architect.
  - d. Name of Contractor.
  - e. Name of firm or entity that prepared submittal.
  - f. Name of subcontractor.
  - g. Name of supplier.
  - h. Name of manufacturer.
  - i. Number and title of appropriate Specification Section.
  - j. Drawing number and detail references, as appropriate.
  - k. Location(s) where product is to be installed, as appropriate.
  - l. Related physical samples submitted directly.
  - m. Other necessary identification.
5. Include the following information as keywords in the electronic file metadata:
  - a. Project name.
  - b. Number and title of appropriate Specification Section.
  - c. Manufacturer name.
  - d. Product name.
  - e. Submittal number.
- F. Options: Identify options requiring selection by the Architect.
- G. Deviations: Identify deviations from the Contract Documents on submittals.
- H. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
  1. Transmittal Form: Use transmittal form acceptable to Architect. Provide locations on form for the following information:
    - a. Project name.
    - b. Date.
    - c. Destination (To:).
    - d. Source (From:).
    - e. Names of subcontractor, manufacturer, and supplier.
    - f. Category and type of submittal.
    - g. Submittal purpose and description.

- h. Specification Section number and title.
  - i. Indication of full or partial submittal.
  - j. Drawing number and detail references, as appropriate.
  - k. Transmittal number.
  - l. Submittal and transmittal distribution record.
  - m. Remarks.
  - n. Signature of transmitter.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
    1. Note date and content of previous submittal.
    2. Note date and content of revision in label or title block and clearly indicate extent of revision.
    3. Resubmit submittals until they are marked with an accepted notation from Architect's action stamp.
  - J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance or observation of construction activities. Show distribution on transmittal forms.
  - K. Use for Construction: Use only final submittals that are marked with an accepted notation from Architect's action stamp.
  - L. Field Reference: Contractor will maintain one (1) complete set of submittals and updated submittal log at the Contractor's Project site office for reference.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  1. Submit electronic submittals via email as PDF electronic files providing electronic format submittals shall be used except where color or texture of materials are to be reviewed.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
  3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated in the event that electronically submitted certificates and certifications are acceptable to Architect.
    - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
  4. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Notation of deviations from the Contract Documents.
    - i. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before or concurrent with Samples.
  6. Submit Product Data in the following format:
    - a. PDF electronic file if format.
    - b. For submittals requiring color or texture review: Four (4) paper copies of Product Data, plus additional copies that may be required by Contractor for distribution unless otherwise indicated. Architect will retain two (2) copies, remainder will be returned.



- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of deviations from the Contract Documents.
    - f. Notation of dimensions established by field measurement.
    - g. Relationship and attachment to adjoining construction clearly indicated.
    - h. Seal and signature of professional engineer if specified.
  2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
  3. Submit Shop Drawings in the following format:
    - a. PDF electronic file format.
    - b. For color or texture submittals: Four (4) opaque (bond) copies of each submittal, plus additional copies that may be required by Contractor for distribution. Architect will retain two (2) copies, remainder will be returned.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
    - e. Notation of deviations from the Contract Documents.
  3. Disposition: Maintain sets of accepted Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  - a. Number of Samples: Submit three (3) full set(s) plus additional full sets that may be required by Contractor for distribution of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will retain one (1) set of submittal with options selected. Remainder will be returned.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three (3) sets of Samples plus additional full sets that may be required by Contractor for distribution. Architect will retain one (1) set of sample sets, remainder will be returned. Mark up and retain one (1) returned Sample set as a Project record sample.
    - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  1. Type of product. Include unique identifier for each product.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.
  4. Location within room or space.
  5. Submit product schedule in the following format:
    - a. PDF electronic file if format.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
  - 4. Submit subcontract list in the following format:
    - a. PDF electronic file.
- J. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- R. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building codes and regulations in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

- T. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for information (RFI) to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally-signed PDF electronic file, if format is acceptable to Architect. Submit four (4) paper copies of certificate, plus additional copies that may be required by Contractor for distribution, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional. Architect will retain two (2) copies, remainder will be returned for record and submittal to permitting agency.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Note deviations from the Contract Documents. Mark with review and approval stamp before submitting to Architect. Submittals not stamped and reviewed by the Contractor may be returned unreviewed.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Review and Approval Stamp: Stamp each submittal with a uniform, review and approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### 3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action or rejected.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Informational Submittals: Architect will review each submittal and will return it as indicated.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior acceptance from Architect.
- E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review or rejected.
- F. Submittals that do not comply with the requirements of the Contract Documents and do not include acceptable identification of deviations may be returned without review by Architect.
- G. Architect's review of re-submittals required due to non-conformance with the requirements, layouts or design intent of the Contract Documents is stipulated as additional services by Architect. Owner is responsible for compensating Architect for such specific additional services unless indicated otherwise by the Owner / Architect Agreement.

- H. Partial Submittals: Partial submittals or incomplete submittals may be reviewed by the Architect, providing such submittals are discussed with, and accepted by, the Architect in advance. The Architect's review of each subsequent submittal related to such partial or incomplete submittals will be considered as an additional service. The Owner is responsible for compensating the Architect for such specific additional services.
- I. Submittals not required by the Contract Documents may not be reviewed and may be discarded or rejected.

END OF SECTION 013300

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
  - 1. Division 01 Section "Allowances" for testing and inspecting allowances.
  - 2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
  - 3. Division 01 Section "Execution" for protection, repair and restoration of construction disturbed by testing and inspection activities.
  - 4. Divisions 02 through 49 Sections for specific test and inspection requirements.

#### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and

completed construction comply with requirements. Services do not include contract observation and related activities performed by Architect.

- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, accepted mockups establish the standard by which the Work will be judged.
1. Laboratory Mockups: Full-size, physical assemblies constructed at testing facility to verify performance characteristics.
  2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on the project site, consisting of multiple products, assemblies and subassemblies.
  3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements and industry standards.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.



#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for review before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for review before proceeding.

#### 1.5 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
  - 1. Indicate manufacturer and model number of individual components.
  - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Contractor's Quality-Control Manager Qualifications: For supervisory personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.

## 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within ten (10) days of Notice to Proceed, and not less than five (5) days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
  - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: Include in quality-control plan a comprehensive schedule of Work requiring testing or inspection, including the following:
  - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
  - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
  - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and accepted mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

## 1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion from the testing agency on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations from the testing agency on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Project records, submit one (1) copy each to Architect of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work. Maintain project record file copy for submittal with closeout documentation.
- 1.9 QUALITY ASSURANCE
- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists to the extent they are more stringent.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:

- a. Provide test specimens representative of proposed products and construction.
  - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
  - c. Provide sizes and configurations of test assemblies and mockups to adequately demonstrate capability of products to comply with performance requirements.
  - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
  - e. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as acceptable to Architect.
  2. Notify Architect at least seven (7) days in advance of dates and times when mockups will be constructed.
  3. Notify Architect, at least seven (7) days in advance of anticipated or planned deviations in the mockup from the Contract Documents.
  4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
  5. Demonstrate the proposed range of aesthetic effects and workmanship.
  6. Obtain Architect's acceptance of mockups before starting work, fabrication, or construction.
    - a. Allow seven (7) days for initial review and each re-review of each mockup.
  7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  8. Demolish and remove mockups when acceptable to Architect, unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup in accordance with Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual specification sections, along with supporting materials.
- M. Room Mockups: Construct room mockups incorporating required materials and assemblies, finished in accordance with requirements. Provide required lighting and additional lighting where required to enable Architect and Owner to evaluate quality of the Work.
- 1.10 QUALITY CONTROL
- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders, or separately by Owner.
  3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies, and Architect if required or indicated, at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities, deviations or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents within twenty (20) days of the commencement of the work. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses. .
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
- 1.11 SPECIAL TESTS AND INSPECTIONS
- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.
- B. Field Testing of Wall and Floor / Ceiling Separation Assemblies for Acoustical Performance: Owner may engage a qualified testing agency, or firm, to conduct field tests and evaluations of wall and floor / ceiling assemblies designated to comply with minimum acoustic performance levels stipulated by the building codes and regulations in effect and adopted by the authorities having jurisdiction. The field tests will be performed at the direction of Owner according to the following criteria;
1. Acoustical field tests will be conducted for each wall and floor / ceiling assembly required to comply with designated minimum acoustic performance criteria including separation walls between dwelling units, separation walls between dwelling units and public spaces and floor / ceiling assemblies between dwelling units and between dwelling units and public spaces.
  2. Acoustical field testing shall include a determination of the apparent sound transmission class (ASTC) rating for each assembly tested. All ASTC testing shall be conducted in accordance with the latest edition and revisions to ASTM E336, "Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings."
  3. Acoustical field testing shall include a determination of the field impact insulation class (FIIC) rating for each floor / ceiling assembly tested. FIIC field testing shall be conducted for each applied floor finish material installed within the test area envelope. All FIIC field testing shall be conducted in accordance with the latest edition and revisions to ASTM E1007, "Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission through Floor – Ceiling Assemblies and Associated Support Structures."
  4. Acoustical field testing shall be conducted to fully constructed conditions, including the completion of all installed finishes to the acceptance of the selected acoustical testing agency or firm.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted.



2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

#### 1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Reviewed": When used to convey Architect's action on Contractor's submittals, applications, and requests, "reviewed" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "accepted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. Installer: An Installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform 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: Using terms 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. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
  - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work.
- J. "Project Site": Space available to the Contractor for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- K. Testing Agencies: A testing agency 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.

## 1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- 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.
- E. Conflicting Requirements: Where compliance with two or more standards is specified and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different but apparently equal and other uncertainties to the Architect for a decision before proceeding.
  1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum

within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

### 1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 49-Division format and MASTERFORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions regarding the style 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 abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
  - 2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
    - a. The words "shall be" are implied wherever a colon (:) is used within a sentence or phrase.

### 1.4 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Project records, submit one (1) copy to Architect 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. Maintain project record file copy for submittal with closeout documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
  - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
- C. Temporary utilities include, but are not limited to, the following:
  - 1. Sewers and drainage.
  - 2. Water service and distribution.
  - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
  - 4. Heating and cooling facilities.
  - 5. Ventilation.
  - 6. Electric power service.
  - 7. Lighting.
  - 8. Telephone service.
- D. Support facilities include, but are not limited to, the following:
  - 1. Temporary roads and paving.
  - 2. Dewatering facilities and drains.
  - 3. Project identification and temporary signs.
  - 4. Waste disposal facilities.
  - 5. Field offices.
  - 6. Storage and fabrication sheds.
  - 7. Lifts and hoists.
  - 8. Temporary elevator usage.
  - 9. Temporary stairs.
  - 10. Construction aids and miscellaneous services and facilities.
- E. Security and protection facilities include, but are not limited to, the following:
  - 1. Environmental protection.

2. Stormwater control.
3. Tree and plant protection.
4. Pest control.
5. Site enclosure fence.
6. Security enclosure and lockup.
7. Barricades, warning signs, and lights.
8. Temporary enclosures.
9. Temporary partitions.
10. Fire protection.

### 1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations at Project Site.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations at Project Site.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations at Project site.

### 1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

### 1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if acceptable to Architect. Provide materials suitable for use intended and as accepted by the authorities having jurisdiction.
- B. Link 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 rails.
- C. Portable Chain-Link 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. Provide galvanized steel bases for supporting posts. Use for temporary fencing separation within Project site and perimeter fence.
- D. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- E. Roofing: Standard-weight, mineral-surfaced, asphalt shingles or asphalt-impregnated and -coated, mineral-surfaced, roll-roofing sheet.
- F. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.
- G. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.
- H. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches
- I. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- J. Paint: Comply with requirements in Division 9 Section "Painting."
- K. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- L. Water: Potable.

### 2.2 TEMPORARY FACILITIES

- A. Field Offices: Prefabricated Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
  - 1. Comply with Local Codes and regulations for tie-down requirements.

## 2.3 EQUIPMENT

- A. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
  - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of eight (8) minimum at each return air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures".
- C. Self-Contained Toilet Units: Single-occupant units of chemical type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- E. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- F. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. 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.



### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
  2. Connect temporary sewers to municipal system as directed by sewer department officials.
  3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
  4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
1. Provide rubber hoses as necessary to serve Project site.
  2. As soon as water is required at each level, extend service to form a temporary water- and fire-protection standpipe. Provide distribution piping. Space outlets so water can be reached with a 100-foot hose. Provide one hose at each outlet.
  3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
  4. Provide pumps to supply a minimum of 30-psi static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel.

3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
    - a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
  4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
    - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.
  5. Locate toilets and drinking-water fixtures so personnel need not walk more than two stories vertically or 200 feet horizontally to facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes and adjacent products.
- G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
1. Install electric power service underground, unless overhead service must be used.
  2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
- H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
  2. Provide warning signs at power outlets other than 110 to 120 V.

3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
  4. Provide metal conduit enclosures or boxes for wiring devices.
  5. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  2. Provide one 100-W incandescent lamp per 500 sq. ft., uniformly distributed, for general lighting, or equivalent illumination.
  3. Provide one 100-W incandescent lamp every 50 feet in traffic areas.
  4. Provide one 100-W incandescent lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
  5. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install (1) one telephone line(s) for each field office and first aid station.
1. Provide additional telephone lines for the following:
    - a. Provide a dedicated telephone line for each facsimile machine and data outlet in each field office.
    - b. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
  2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Architect's office.
    - e. Owner's office.
    - f. Principal subcontractors' field and home offices.
  3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- K. Electronic Communication Service: Provide a laptop computer in the primary field office adequate for use by Architect and Owner to access project electronic documents and maintain electronic communications.

### 3.3 SUPPORT FACILITIES INSTALLATION

#### A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
3. Maintain support facilities until Architect schedules Substantial Completion site observation. Remove before Substantial Completion with acceptance of Owner. Personnel remaining after Substantial Completion may be permitted to use permanent facilities, under conditions acceptable to Owner.

#### B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide a reasonably level, graded, well-drained subgrade of satisfactory soil material, compacted to not less than 95 percent of maximum dry density in the top 6 inches or as required by authorities having jurisdiction.
2. Provide gravel paving course of subbase material not less than 3 inches thick; roller compacted to a level, smooth, dense surface.
3. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

#### C. Temporary Use of Permanent Roads and Paved Areas: To the extent that temporary roads and paved areas are in same location as permanent roads and paved areas, construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving" or as indicated on Site Engineering Contract Documents.
3. Recondition base after temporary use, including but not limited to, removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving" or as indicated on Site Engineering Contract Documents.

#### D. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

- E. Parking: Provide temporary parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
  - 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touchup signs so they are legible at all times.
- H. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
  - 1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
  - 2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.
- J. Janitorial Services: Provide janitorial services on a bi-weekly for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas.
- K. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- L. Common-Use Field Office: Provide an insulated, weathertight, air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project site. Keep office clean and orderly.
  - 1. Furnish and equip offices as follows:

- a. Desks (2) and four chairs, four-drawer file cabinet, (2) plan tables, a plan rack, and bookcase.
  - b. Water cooler and private toilet complete with water closet, lavatory, and medicine cabinet with mirror.
  - c. Coffee machine and supplies, including regular and decaffeinated coffee, filters, cups, stirring sticks, creamer, sugar, and sugar substitute.
  - d. Provide a room of not less than 240 sq. ft. for Project meetings. Furnish room with conference table, 12 folding chairs, and 4-foot- square tack board.
2. Provide an electric heater with thermostat capable of maintaining a uniform indoor temperature of 68 deg F. Provide an air-conditioning unit capable of maintaining an indoor temperature of 72 deg F.
  3. Provide fluorescent light fixtures capable of maintaining average illumination of 20 fc at desk height. Provide 110- to 120-V duplex outlets spaced at not more than 12-foot intervals, with a minimum of 1 per wall in each room.
- M. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
  2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.
- N. Temporary Elevator Use: Refer to Division 14 Sections for temporary use of new elevators.
- O. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- P. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.
- 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION
- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.

2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
  3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from the project site during the course of the project.
  4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to periodically inspect and perform extermination and control procedures as required so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- F. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
1. Set fence posts in compacted mixture of gravel and earth.
  2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
  3. Provide fence and gates accepted by the authorities having jurisdiction.
  4. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including painting in appropriate colors and graphics, warning signs and lighting.
- I. Temporary Egress: Maintain unobstructed temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities that would cause permanent damage to the in place work.

1. Where required by product manufacturers and heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
  3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
  4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
  5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant-treated material for framing and main sheathing.
- K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas from fumes and noise.
1. Construct dustproof partitions to separate areas occupied by Owner of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and 1/2-inch fire-retardant plywood on construction side.
  2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
  3. Insulate partitions to control noise transmission to occupied areas.
  4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  5. Protect air-handling equipment.
  6. Provide walk-off mats at each entrance.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Prohibit smoking in construction areas.
  2. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
    - a. Field Offices: Class A stored-pressure water-type extinguishers.
    - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
    - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
  3. Store combustible materials in containers in fire-safe locations.
  4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
  5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.



6. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
7. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
8. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  1. Protect porous materials from water damage.
  2. Protect stored and installed material from flowing or standing water.
  3. Keep porous and organic materials from coming into prolonged contact with concrete.
  4. Remove standing water from decks.
  5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  2. Keep interior spaces reasonably clean and protected from water damage.
  3. Periodically collect and remove waste containing cellulose or other organic matter.
  4. Discard or replace water-damaged material.
  5. Do not install material that is wet.
  6. Discard, replace or clean stored or installed material that begins to grow mold.
  7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  1. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for forty-eight (48) hours are considered defective.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-

eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect and Owner.

- c. Remove materials that can not be completely restored to their manufactured moisture level within seventy-two (72) hours.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

#### 1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and accepted through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Substitutions: Changes in products, materials, equipment and methods of construction from those required by the Contract Documents and accepted through the submittal process.
- D. Owner Named Product: A product named or specified that shall be used unless approved by Owner and Architect. These products are typically used on Owner projects and have a history of performing well and they are comfortable with their maintenance requirements. Use of a different product will require Owner approval, which may be rejected for any reason without cause.

### 1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect may notify Contractor of acceptance or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later providing conclusive review can be achieved.
    - a. Form of Acceptance: As specified in Division 01 Section "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.
- C. Owner Named Product change request: Comply with requirements for a Substitution.

### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine acceptability of products to be used.

### 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for observation and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic protected from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide stipulated specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Where products are accompanied by the term "match sample", sample to be matched is determined by Architect.
  6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or accepted equal," or "or accepted," comply with requirements in "Comparable Products" Article to obtain acceptance for use of an unnamed product.
  8. Owner Named Products: Provide named product unless approved by Substitution process by Owner and Architect.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  4. Manufacturers:

- a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  - c. Owner Named Product: Provide product from listed manufacturer that complies with requirements.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match sample", provide a product that complies with requirements and matches Architect's designated sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000



## SECTION 017700 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Substantial Completion procedures.
  2. Final completion procedures.
  3. Warranties.
  4. Final cleaning.

#### 1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting site observation for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  2. Advise Owner of pending insurance changeover requirements.
  3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  8. Complete startup testing of systems.
  9. Submit test/adjust/balance records.
  10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  11. Advise Owner of changeover in heat and other utilities.
  12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
  13. Complete final cleaning requirements, including touchup painting.
  14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
  15. Provide summary report of commissioning procedures employed for project.

- B. Observation: Submit a written request for site observation for Substantial Completion. Contractor is to provide their Substantial Completion punch list identifying any incomplete or corrective work. On receipt of request, Architect will evaluate the Substantial completion punch list and either proceed with site observation or notify Contractor of requirements Architect requires to be considered for Substantial Completion. Architect will prepare the Certificate of Substantial Completion after site observation 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. Repeat Observation: Request site observation when the Work identified in previous site observation reports as incomplete is completed or corrected.
  - 2. Results of completed site observation findings and report will form the basis of requirements for final completion.

### 1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final observation for determining final completion, complete the following:
  - 1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
  - 2. Submit certified copy of Architect's/Contractor's Substantial Completion site observation findings and reported list of items to be completed or corrected (punch list), as issued and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  - 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 4. Submit pest-control final inspection report and warranty.
  - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit report of Owner's personnel training sessions.
- B. Observation: Submit a written request for final site observation for acceptance. On receipt of request, Architect will either proceed with site observation or notify Contractor of unfulfilled requirements. Architect will review Contractor's final Application for Payment after site observation or will notify Contractor of construction that must be completed or corrected before Contractor's final Application will be reviewed.
  - 1. Repeat Observation: Request site observation when the Work identified in previous site observation reports as incomplete is completed or corrected.

### 1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Submit list of incomplete items in the following formats:
  - a. PDF electronic file as acceptable to Architect.

## 1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within ten (10) days of completion of designated portions of the Work that are completed, accepted for occupancy by issuance of a Certificate of Occupancy form by the authorities having jurisdiction, and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file as acceptable to Architect with links enabling navigation to each item. Provide table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

### PART 3 - EXECUTION

#### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting site observation for acceptance of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove obstructions to provide safe access to, and egress from, building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
    - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

- n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - q. Clean ducts, blowers, and coils if units were operated with dirty filters or without filters during construction or that display contamination with particulate matter upon inspection.
  - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a final certification report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

## SECTION 017823 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product, material, and finishes care and maintenance manuals.
  - 5. Systems and equipment care and maintenance manuals.

#### 1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.3 QUALITY ASSURANCE

- A. Maintenance Manual Preparation: In preparation of manuals, use personnel thoroughly trained and experienced in the maintenance of the material or finish involved, or in the maintenance of the equipment or system involved.
  - 1. Where manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
  - 2. Where manuals require drawings or diagrams, use draftspersons capable of preparing drawings clearly in an understandable format.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. Submit 3 disks of organized PDF copy, include a complete operation and maintenance directory.

- C. Digital PDF Manual Submittal: Submit each manual in final draft form prior to requesting site observation for Substantial Completion and at least fifteen (15) days before commencing demonstration and training.
  - 1. Correct or modify each manual to comply with Architect's comments. Submit three (3) digital copies of each corrected manual within ten (10) days of receipt of Architect's comments and prior to commencing demonstration and training.

## PART 2 - PRODUCTS

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
  - 1. List of Table of contents.
  - 2. List of documents.
  - 3. List of systems.
  - 4. List of equipment.
  - 5. List of building interior products, materials and finishes.
  - 6. List of building exterior products, materials and finishes.
  - 7. List of warranties and guarantees with guide reference to Warranties and Bonds Manual.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. List of Interior Products, Materials and Finishes: List exposed products, materials and finishes organized alphabetically.
- F. List Exterior Products, Materials and Finishes: List exposed products, materials and finishes organized alphabetically.
- G. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Architect.
  7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

## 2.3 MANUAL CONTENT, GENERAL

- A. In each manual, include information specified in the individual Specification section and the following information where applicable for each major component:
1. General material, finish, system or equipment description.
  2. Copies of applicable Shop Drawings and Product Data.
  3. Material, finish, system or equipment identification, including:
    - a. Name of manufacturer.
    - b. Model number.
    - c. Serial number of each component.
  4. Maintenance procedures and schedules.
  5. Precautions against improper use and maintenance.
  6. Copies of warranties and service contracts.
  7. Sources of required maintenance materials and related services.



8. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Specifications format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume. Where more than one volume is required to accommodate the data, provide a comprehensive table of contents for all volumes in each volume of the set.
  9. General Information: Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or installer and the maintenance contractor. Clearly delineate the extent of responsibility for each of these entities. Include a local source for replacement parts for equipment.
  10. Product Data: Where the manuals include manufacturer's standard printed data, include only those sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item contained in the product data, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
  11. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper maintenance of materials or finishes, or for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included elsewhere in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
  12. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation.
  13. Warranties, and Service Contracts: Provide a copy of each warranty or service contract in the appropriate manual for the information of the Government's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect the validity of warranty.
- B. Where required for full understanding, include a copy of applicable Project Record Drawings. Do not use original Project Record Documents as part of operation and maintenance manuals.
- 2.4 EMERGENCY MANUALS-EMERGENCY MANUALS ARE THE ONLY MANUALS THAT ARE REQUIRED TO BE DIGITAL AND PAPER COPIES. PROVIDE THREE PAPER COPIES.
- A. Content: Organize manual into a separate section for each of the following:
    1. Type of emergency.
    2. Emergency instructions.
    3. Emergency procedures.
  - B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
  2. Flood.
  3. Water leak.
  4. Power failure.
  5. Water outage.
  6. System, subsystem, or equipment failure.
  7. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 2.5 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor is delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.

- C. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.
  - 4. Regulation and control procedures.
  - 5. Instructions on stopping.
  - 6. Normal shutdown instructions.
  - 7. Seasonal and weekend operating instructions.
  - 8. Required sequences for electric or electronic systems.
  - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 2.6 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds. Owner review and acceptance of warranties and bonds is required.

1. Include procedures to follow and required notifications for warranty claims.

## 2.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds. Owner review and acceptance of warranties and bonds is required.
  - 1. Include procedures to follow and required notifications for warranty claims.

### PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and

flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
  2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."
- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

## SECTION 033000 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including miscellaneous formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes
- B. Post Tension foundation / slab see section 033816
- C. See Division 07 Section 071616 "Crystalline Waterproofing" for admixture required on all elevator pits.

#### 1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete mix includes alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- D. Welding Certificates: Copies of certificates for welding procedures and personnel.

- E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
  
- F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Cementitious materials and aggregates.
  - 2. Form materials and form-release agents.
  - 3. Steel reinforcement and reinforcement accessories.
  - 4. Fiber reinforcement.
  - 5. Admixtures.
  - 6. Waterstops.
  - 7. Curing materials.
  - 8. Bonding agents.
  - 9. Adhesives.
  - 10. Vapor barrier.
  - 11. Epoxy joint filler.
  - 12. Joint-filler strips.
  - 13. Repair materials.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
  
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
  
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
  
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.



1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
  2. Contractor shall *engage and pay* for concrete testing.
- E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- F. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- G. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
1. ACI 301, "Specification for Structural Concrete."
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
  3. ACI 305R, "Recommendations for hot weather concrete placement".

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

### PART 2 - PRODUCTS

#### 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.

## 2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
  
- B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

## 2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
  - 1. Provide plastic supports.
  
- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

## 2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
  
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
  - 1. Class: Moderate weathering region, but not less than 3M.
  - 2. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
  
- C. Lightweight Aggregate: ASTM C 330.

1. Nominal Maximum Aggregate Size: 3/8 inch.

D. Water: Potable and complying with ASTM C 94.

## 2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

E. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

## 2.6 FIBER REINFORCEMENT

A. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1 inch long.

B. Available Products: Subject to compliance with requirements, Provide one of the following:

1. Fibrillated Fibers:

a. Fibrasol F; Axim Concrete Technologies.

b. Fibermesh; Fibermesh, Div. of Synthetic Industries.

c. Forta CR; Forta Corporation.

d. Grace Fibers; W. R. Grace & Co., Construction Products Div.

## 2.7 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory-fabricate corners, intersections, and directional changes.

1. Profile: Flat, dumbbell with center bulb.

- B. Available Manufacturers: Subject to compliance with requirements Provide one of the following:
1. Rubber Waterstops:
    - a. Greenstreak.
    - b. Progress Unlimited Inc.
    - c. Westec Barrier Technologies; Div. of Western Textile Products, Inc.
    - d. Williams Products, Inc.
- 2.8 VAPOR BARRIER AND TAPE-THIS IS A COMPONENT OF THE RADON SYSTEM AND MUST BE LAPPED AND SEALED AT ALL JOINTS AND PENETRATIONS. The Vapor Barrier must be installed meeting ASTM E1465 requirements for Radon control in low rise residential buildings.
- A. Approved Manufacturers:
- Provide 10 mil, Class-A Below Slab Vapor Barrier, subject to meeting project requirements, Manufacturers that may be considered are noted below:
1. W. R. Meadow's: Perminator vapor barrier and tape
  2. Fortifiber Corporation: Moistop and Moistop Tape.
  3. Raven Industries, Inc.: Vapor Block and Vapor Bond Tape
  4. Stego Industries, LLC: Stego Wrap and Stego Tape
  5. Tex-Trude: X-Treme
  6. Or Approved Equal.
- B. Vapor Barrier: ASTM E 1745, Class A, of one of the following materials; or polyethylene sheet, not less than 10 mils thick minimum:
1. Non-woven, polyester-reinforced, polyethylene coated sheet.
  2. Three-ply, nylon- or polyester-cord-reinforced, laminated, high-density polyethylene sheet.
  3. Tape and barrier shall be as manufactured by the same company and approved for use in sealing Vapor Barrier for Radon Systems. (USING COMMERCIAL DUCT TAPE IS NOT AN ACCEPTABLE METHOD OF SEALING)
- 2.9 Curing Materials: Use Method that is most compatible with Floor Finish Material.
- A. Evaporation barrier: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class A.

- C. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- D. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- E. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- F. Water: Potable and complying with ASTM C 94.
- G. Available Products: Subject to compliance with requirements, provide one of the following:
  - 1. Evaporation barrier:
    - a. W. R. Meadows – Evapre.
    - b. Burke; True Etch.
    - c. Lambert; Lambco Skin.
    - d. Euclid; Eucobar.
  - 2. Clear, Waterborne, Membrane-Forming Curing Compound:
    - a. Burke; Aqua Resin Cure.
    - b. Lambert; Aqua-Kure.
    - c. Diamond Clear VOX; Euclid Chemical Co.
    - d. W. R. Meadows, Inc. - 1100 Clear.
  - 3. Clear, Solvent-borne, Membrane-Forming Curing and Sealing Compound:
    - a. Meadows CS-309/25.
    - b. Burke; 1315 Cure Seal.
    - c. Lambert Corporation; UV Super Seal.
    - d. Euclid; Ever Clear.
  - 4. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
    - a. Vocomp-30; W. R. Meadows, Inc.
    - b. Burke; Klear-Kote Cure-Sealer-Hardener, 30 percent solids.
    - c. Lambert Corporation; UV Safe Seal.
    - d. Euclid; Super Diamond Clear Vox.

## 2.10 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

- C. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
  - 1. Type: Class I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
  - 2. Type: Class IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
  
- D. Reglets: Fabricate reglets of not less than 0.0217-inch- thick galvanized steel sheet. Temporarily fill or cover face opening of reglets to prevent intrusion of concrete or debris.
  
- E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

## 2.11 REPAIR MATERIALS.

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109/C 109M.S
  
- B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.
  - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

## 2.12 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
  - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
  
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
  
- C. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows:
  - 1. Compressive Strength (28 Days): (3,000 PSI) as indicated.
  - 2. Maximum Slump: 5 inches.
  
- D. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
  - 1. Compressive Strength (28 Days): (3,000 PSI) as indicated.
  - 2. Maximum Slump: 5 inches.
  - 3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2- to 4-inch slump.
  
- E. Elevated slab over wood frame at stair landings:  
See Section 03530
  - 1. Compressive strength (28 days): (4,000 PSI)
  - 2. Maximum Slump: 5 inches
  
- F. Precast concrete stair treads:  
See section 055100
  - 1. Compressive strength: (28 days) (5,000 PSI)
  
- G. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements.
  
- H. Maximum Water-Cementitious Materials Ratio: 0.50 for concrete required to have low water permeability.
  
- I. Maximum Water-Cementitious Materials Ratio: 0.40 for corrosion protection of steel reinforcement in concrete exposed to chlorides from deicing chemicals, salt, saltwater, brackish water, seawater, or spray from these sources.

- J. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2 to 4 percent, unless otherwise indicated.
- K. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
- L. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd. for slab on grades and pads without wire mesh.
- M. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  - 4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

## 2.13 FABRICATING REINFORCEMENT

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

## 2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.



- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class B, 1/4 inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
  - 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sand, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor bolts, accurately located, to elevations required.
  - 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures for connection to masonry walls.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
  - 1. At least 70 percent of 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 SHORES AND RESHORES

- A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI'S "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier before placing concrete.
  
- B. Clean reinforcement of loose rust and mill scale, earth and other foreign materials.
  
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Shop - or field-weld reinforcement according to AWS D1.4, where indicated.
  
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
  
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire. Support wire mesh on chairs of sufficient height and spacing to ensure the mesh stays in the upper half of the slab.
  
- F. Install rebar with the clearances set forth in The Building Code which includes the following:
  - 1. Soil: 3 inches.
  - 2. Exterior Form: 1-1/2 inches.
  - 3. Interior Form: ¾ inches.
  - 4. Adjacent Bars: 1 inch.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
  
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
  3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints in non-post-tensioned slabs-on-grade, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. Sawn Joints: Form contraction joints with power saws equipped with shatter-proof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrad or otherwise damage surface and before concrete develops random contraction cracks.
  2. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  3. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  4. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- D. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.7 INSTALLATION OF VAPOR BARRIER

- A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
  2. Provide termite control.
  3. Install polyethylene vapor barrier.
    - a. Provide 6 inch overlap.
    - b. Tape all joints and penetrations.
    - c. Install vapor barrier per manufacturer's recommendations.

### 3.8 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed water-

stops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

### 3.9 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. **Do not add water to concrete** during delivery, at Project site, or during placement, unless approved by Architect.
- C. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- E. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
  - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
  6. Pull wire mesh into concrete during placement.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
  4. Where concrete temperatures become 90 degrees or higher, limit time from batching to final placement to less than 60 minutes.
- H. Cold-Weather Placement: Comply with ACI 306.1 and as follow. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

### 3.10 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, or painting.

- C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
  - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.11 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
  
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes.
  - 1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, Portland cement terrazzo, and other bonded cementitious floor finishes.
  - 2. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
  - 3. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
  
- C. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system
  - 2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F (F) 35; and levelness, F (L) 25; with minimum local values of flatness, F (F) 24; and levelness, F (L) 17; for slabs-on-grade.

- b. Specified overall values of flatness, F (F) 30; and levelness, F (L) 20; with minimum local values of flatness, F (F) 24; and levelness, F (L) 15; for suspended slabs.
  - 3. Finish and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot- long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
    - a. 1/4 inch.
- D. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- E. Broom Finish: Apply a medium broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. Exterior Condenser Pads: Provide fiber reinforced 3000 psi concrete, for pads.

### 3.13 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.



- B. Evaporation barrier: Apply evaporation barrier to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
  
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
  
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period. Use material that is compatible with final floor finish system.
  - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period. Use material that is compatible with final floor finish system and adhesives. Provide where the concrete slab is the finish floor such as the garage slabs.

### 3.14 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.15 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, pop outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish blending with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.
- 3.16 FIELD QUALITY CONTROL
- A. Testing Agency: The Contractor shall engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  4. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of minimum four standard cylinder specimens for each composite sample.
    - a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days. Additional testing may occur at 3 days and at 14 days for early strength concrete.
    - a. Test two field-cured specimens at 7 days and two at 28 days.
    - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 80 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Strength of each concrete mix 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.
- E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

- F. 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.
  
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
  
- H. Testing laboratory shall reject any and all concrete that does not comply with slump or is not within temperature/delivery time requirements.

END OF SECTION 033000

SECTION 033816 - POST-TENSIONED CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Furnishing post-tensioning reinforcement and accessories including prestressing tendons, pocket formers, support bars, bar chairs, and slab bolsters for post tension and conventional concrete work.
2. Installing post-tensioning tendons.
3. Performing post-tensioning operations including stressing and finishing tendons.
4. Recording tendon elongations and gage pressures.
5. Finishing tendon ends and patching stressing pockets.
6. Footings.
7. Foundation walls.
8. Slabs-on-grade.
9. Formwork

1.2 DEFINITIONS

- A. Strand Tail: Excess strand length extending past the anchorage device.
- B. Stressing Block-out: Opening created in the slab to allow access to stressing-end anchorages.
- C. Stressing Pocket: Void formed by pocket former at stressing-end anchorage to provide required cover over wedges and strand tail.
- D. Wedge Cavity: Cone-shaped hole in anchorage device designed to hold the wedges that anchor the strand.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design cast-in-place, post-tensioned concrete reinforcement as indicated in this Section. Show final effective forces, tendon profiles, and non-prestressed reinforcement on design Shop Drawings.
- B. Employ professional Engineer, licensed in the state of Florida and acceptable to Owner and Structural Engineer, to perform design. Sign and seal design Shop Drawings and design calculations submitted to Architect for review. Prepare and seal drawings and calculations for submittal to authorities having jurisdiction. Comply with design intent, criteria, and requirements of the Contract Documents.
- C. A Geotechnical Engineer registered in the state of Florida shall inspect the condition and assure the adequacy of a subgrades, fills and backfills before placement of foundations, slabs and

walls. He shall submit reports to the Architect / Engineer describing his investigations including any non-conforming work. Earthwork shall be performed under the supervision of a licensed soil testing company to assure compliance with requirements of the soils report and specifications.

- D. Design structure to withstand the following loads according to governing codes, within limits and under conditions indicated:
1. Dead Loads: See Structural Drawings.
  2. Live Loads: See Structural Drawings.
  3. Wind Loads:
    - a. Wind Speeds: As indicated.
    - b. Risk Category: II
    - c. Exposure Category: As indicated.
- E. Average Pre-compression:
1. Minimum Average Slab Pre-compression: 125 psi.
  2. Minimum Average Pre-compression in T-, L-, and Rectangular-Beam Cross Sections: 200 psi.
- F. Comply with ACI 318 limits on stresses at transfer of pre-stress and under service load.
- G. Comply with ACI 318 requirements for minimum bonded reinforcement.
- H. Comply with ACI 318 requirements for concrete cover over reinforcement.
- I. Deflection Limits Including Creep and Shrinkage Effects:
1. Total Dead Load:  $L/600$ .
  2. Total Dead Plus Live Load:  $L/360$ .
- J. Slab Design:
1. Minimum Slab on Grade Thickness: 4 inches
  2. Locate closure strips at mid-span and adjust tendon forces and profiles accordingly. Calculate moments in spans with closure strips assuming a continuous slab. Provide only non-prestressed reinforcement within closure strips. Design reinforcement in closure strip to carry ultimate moment at mid-span.
- 1.4 INSURANCE: The post-tensioning Specialty Engineer shall carry Professional Liability "Errors and Omissions" coverage for design liability for not less than 1 million dollars and furnish the Architect and Structural Engineer an Insurance certificate prior to submitting shop drawings for review.
- 1.5 SUBMITTALS
- A. Product Data: For the following:

1. Concrete Mix Designs and Admixtures
    - a. Indicate locations where each design will be used.
    - b. Indicate amounts of mix water to be withheld for later addition at Project site.
  2. Vapor Barriers and Tape.
  3. Fiber reinforcement.
  4. Post-tensioning coating.
  5. Tendon sheathing.
  6. Anchorage devices.
  7. Tendon couplers.
  8. Bar and tendon supports.
  9. Pocket formers.
  10. Sheathing repair tape.
  11. Form Release Agents
  12. Curing Compounds.
  13. Stressing-pocket patching material.
- B. Shop Drawings: Installation drawings including plans, elevations, sections, details, and notes prepared by or under the supervision of a registered professional engineer detailing tendon layout and installation procedures, including the following:
1. Numbers, arrangement, and designation of post-tensioning tendons.
  2. Tendon profiles and method of tendon support including chair heights and locations. Show tendon profiles at sufficient scale to clearly indicate all support points, with their associated heights.
  3. Construction joint locations, pour sequence, locations of anchorages and blockouts required for stressing.
  4. Stressing procedures and jacking force to result in final effective forces used in determining number of tendons required.
  5. Sealed calculations prepared by a registered structural engineer indicating method of elongation calculation including values used for friction coefficients, anchorage seating loss, elastic shortening, creep, relaxation, and shrinkage.
  6. Calculated elongations for each tendon.
  7. Details for horizontal curvature around openings and at anchorages.
  8. Details for corners and other locations where tendon layouts may conflict with one another or non-prestressed reinforcing steel.
  9. Diagrams and notes as necessary for positioning of non-prestressed reinforcement required for installing post-tensioning tendons including, but not limited to, the following:
    - a. Support bars.
    - b. Backup bars and hairpins at anchorages.
    - c. Hairpins at locations of horizontal curvature.
    - d. Supplemental reinforcement at block-outs.
- A. Design Shop Drawings and calculations.
- B. Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.



- C. Product Certificates:
  - 1. For each type of anchorage device and coupler, signed by product manufacturer.
  - 2. For each type of encapsulation system, signed by product manufacturer.
- D. Qualification Data: For Installer, manufacturer and testing agency.
- E. Proof of Insurance.
- F. Mill Test Reports: Certified mill test reports for prestressing strand used on Project indicating that strand is low-relaxation and including the following:
  - 1. Coil numbers or identification.
  - 2. Breaking load.
  - 3. Load at 1 percent extension.
  - 4. Elongation at failure.
  - 5. Modulus of elasticity.
  - 6. Diameter and net area of strand.
- G. Field quality-control test reports.
- H. Procedures Statement: Procedures for cutting excess strand tail and patching stressing pocket.
- I. Stressing Jack Calibration: Calibration certificates for jacks and gages to be used on Project. Calibrate each jack-and-gage set as a pair.
- J. Stressing Records: Filled out by testing agency during stressing operation with the following information recorded:
  - 1. Name of Project.
  - 2. Building number and concrete placement area.
  - 3. Date of stressing operation.
  - 4. Weather conditions including temperature and rainfall.
  - 5. Name and signature of inspector.
  - 6. Name of individual in charge of stressing operation.
  - 7. Serial or identification numbers of jack and gage.
  - 8. Date of jack-and-gage calibration certificates.
  - 9. Gage pressure to achieve required stressing force per supplied calibration chart.
  - 10. Tendon identification mark.
  - 11. Calculated tendon elongation.
  - 12. Actual tendon elongation.
  - 13. Actual gage pressure.

## 1.2 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer whose full-time Project superintendent has successfully completed PTT'S Level 1 - Field Fundamentals course or has equivalent verifiable experience and knowledge.

- B. Manufacturer Qualifications: Fabricating plant certified by PTI according to procedures set forth in PTI'S "Manual for Certification of Plants Producing Unbonded Single Strand Tendons."
  - C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  - D. Testing Agency Inspector: Personnel performing field inspections and measuring elongations shall have successfully completed PTI'S Level 1 - Field Fundamentals course or shall have equivalent qualifications acceptable to Architect. Concrete Testing Service.
  - E. Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
  - F. Source Limitations: Obtain post-tensioning materials and equipment from the same supplier.
    - 1. Stressing jacks not provided by post-tensioning supplier must be calibrated and approved for use on Project by post-tensioning supplier.
  - G. ACI Publications:
    - 1. Comply with ACI 423.6, "Specification for Unbonded Single Strand Tendons," unless otherwise indicated in the Contract Documents.
    - 2. Comply with ACI 301, "Specification for Structural Concrete.
    - 3. Comply with ACI 117, "Specification for Tolerances for Reinforced Concrete",
    - 4. Comply with ACI 318, "Specification for Building Code Requirements for Reinforced Concrete".
    - 5. Comply with ACI 305R, "Specification for placement of hot and cold weather Concrete placement".
- 1.3 DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, and handle post-tensioning materials according to PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
  - B. Inspect tendons and accessory items at time of their delivery to Project site, prior to off-loading. Notify post-tensioning supplier of observed damage prior to off-loading.
  - C. Keep accurate and current records of materials delivered and used.
  - D. Immediately remove from Project site any tendons with damaged strand.
  - E. Deliver, store, and handle steel reinforcement to prevent bending and damage.
    - 1. Avoid damaging coatings on steel reinforcement and post tension cables.
    - 2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.

#### 1.4 COORDINATION

##### A. Attachments and Penetrations:

1. Attach permanent fixtures such as curtain-wall systems, handrails, fire-protection equipment, lights, and security devices to the slab using embedded anchors. Drilled anchors are not allowed unless authorized in writing by Architect.
2. Power-driven fasteners are not allowed unless authorized in writing by Architect.
3. Core drilling for sleeves or other penetrations is not allowed unless authorized in writing by Architect.
4. Protect penetrations within 18 inches of an anchorage with ASTM A 53/A 53M, Schedule 40 steel pipe.

#### PART 2 - PRODUCTS

##### 2.1 FORM-FACING MATERIALS

- A. A.Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass fiber reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.

##### 2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

- B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets having a guaranteed minimum tensile strength of 70,000 psi.

### 2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

### 2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
- B. Fly Ash: ASTM C 618, Class F.
- C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
  - 1. Class:
    - 1. Moderate weathering region, but not less than 3M for Interior concrete.
    - 2. Severe weathering region for Exterior Concrete.
  - 2. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
- D. Lightweight Aggregate: ASTM C 330.
  - 1. Nominal Maximum Aggregate Size: 3/8 inch.
- E. Water: Potable and complying with ASTM C 94.

### 2.5 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.6 FIBER REINFORCEMENT

- A. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1 inch long.

2.7 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
  2. Proportion lightweight structural concrete according to ACI 211.2 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): (3,000 PSI) as indicated.
  2. Maximum Slump: 4 inches.
- D. Slabs: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): (3,000 PSI) as indicated.
  2. Maximum Slump: 4 inches.
  3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2- to 4-inch slump.
- E. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements.
1. Water/cement Ratio: 0.50 or less for exposed concrete
- F. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.
- G. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixes at exterior locations.

2.8 CONCRETE MIXING

- A. A.Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ACI 301, ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2.9 VAPOR BARRIER AND TAPE-THIS IS A COMPONENT OF THE RADON SYSTEM AND MUST BE LAPPED AND SEALED AT ALL JOINTS AND PENETRATIONS.

- A. Vapor Barrier: ASTM E 1745-11, Class A, of one of the following materials; or polyethylene sheet, ASTM D4397, 10 mil thick, minimum:
1. Non-woven, polyester-reinforced, polyethylene coated sheet.
  2. Three-ply, nylon- or polyester-cord-reinforced, laminated, high-density polyethylene sheet.
  3. Tape and barrier shall be as manufactured by the same company and approved for use in sealing Vapor Barrier for Radon Systems. (USING COMMERCIAL DUCT TAPE IS NOT AN ACCEPTABLE METHOD OF SEALING)
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but not limited to, the following:
1. Fortifiber Building Products: Moistop and Moistop Tape.
  2. W.R. Meadows: Perminator and barrier tape.
  3. Raven: Rufco 300 and 4" Rufco Tape.
  4. Stego Industries LLC, Stego Wrap and Stego Tape
  5. Tex-Textrode – X-treme
  6. Or approved equal.

2.10 PRESTRESSING TENDONS

- A. Prestressing Strand: ASTM A 416/A 416M, Grade 270, uncoated, 7-wire, low-relaxation, 0.5 inch diameter strand.
- B. Post-Tensioning Coating: Compound with friction-reducing, moisture-displacing, and corrosion-inhibiting properties specified in ACI 423.6; chemically stable and nonreactive with prestressing steel, nonprestressed reinforcement, sheathing material, and concrete.
1. Minimum Coating Weight: 2.5 lb for 0.5-inch diameter strand per 100 feet of strand.
  2. Completely fill annular space between strand and sheathing over entire tendon length with post-tensioning coating.
- C. Tendon Sheathing: Comply with ACI 423.6.

1. Minimum Thickness: 0.050 inch for polyethylene or polypropylene with a minimum density of 0.034 lb/cu. in.
  2. Continuous over the entire length of tendon to provide watertight encapsulation of strand and between anchorages to prevent intrusion of cement paste or loss of coating for a non-encapsulated system.
- D. Anchorage Device and Coupler Assembly: Assembly of strand, wedges, and anchorage device or coupler complying with static and fatigue testing requirements in ACI 423.6 and capable of developing 95 percent of actual breaking strength of strand.
1. Anchorage Bearing Stresses: Comply with ACI 423.6 for stresses at transfer load and service load.
  2. Fixed-End Anchorage Device Assemblies: Plant fabricated with wedges seated at a load of not less than 80 percent and not more than 85 percent of breaking strength of strand.
- E. Encapsulation System: Watertight encapsulation of prestressing strand consisting of the following:
1. Wedge-Cavity Caps: Attached to anchorages with a positive mechanical connection and completely filled with post-tensioning coating.
    1. Caps for Fixed and Stressing-End Anchorages Devices: Designed to provide watertight encapsulation of wedge cavity. Sized to allow required extension of strand past the wedges.
      - 1) Attach cap for fixed-end anchorage device in fabricating plant.
    2. Caps at Intermediate Anchorages: Open to allow passage of strand.
  2. Sleeves: Attached to anchorage device with positive mechanical connection; overlapped a minimum of 4 inches with sheathing and completely filled with post-tensioning coating.
- 2.11 NONPRESTRESSED STEEL BARS
- A. Support Bars, Reinforcing Bars and Hairpins: ASTM A 615/A 615M, Grade 60, deformed. Minimum support bar size is 1/2 inch.
  - B. Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening tendons and tendon support bars in place. Manufacture bar supports, according to CRSI'S "Manual of Standard Practice," from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
    1. For uncoated bars, use all-plastic bar supports.
- 2.12 POST TENSION ACCESSORIES
- A. Pocket Formers: Capable of completely sealing wedge cavity; sized to provide the required cover over the anchorage and allow access for cutting strand tail.
  - B. Anchorage Fasteners: Stainless-steel nails for Exterior locations and Galvanized steel nails at Interior locations, wires, and screws used to attach anchorage devices to formwork.

- C. Sheathing Repair Tape: Elastic, self-adhesive, moisture proof tape with minimum width of 2 inches, in contrasting color to tendon sheathing; non-reactive with sheathing, coating, or prestressing steel.
- 2.13 CURING MATERIALS: Provide product or system compatible with finish floor material or coating.
- 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. dry.
  - C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
  - D. Water: Potable.
  - E. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
  - F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- 2.14 RELATED MATERIALS
- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
  - B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
  - C. Reglets: Fabricate reglets of not less than 0.0217-inch- thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- 2.15 PATCHING MATERIAL
- A. Patching Material: One component, polymer-modified, premixed patching material containing selected silica aggregates and Portland cement, suitable for vertical and overhead application. Do not use material containing chlorides or other chemicals known to be deleterious to prestressing steel or material that is reactive with prestressing steel, anchorage device material, or concrete.



### PART 3 - EXECUTION

#### 3.1 FORMWORK

- A. Provide formwork to support load redistribution that may occur during stressing operation. Ensure that formwork does not restrain elastic shortening, camber, or deflection resulting from application of prestressing force.
- B. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- C. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- D. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
  - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- E. Construct forms tight enough to prevent loss of concrete mortar.
- F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces.
- G. Chamfer exterior corners and edges of permanently exposed concrete.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

#### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- B. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC'S "Code of Standard Practice for Steel Buildings and Bridges.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
- B. Clean and repair surfaces of forms to be reused in the Formwork. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
- B. Lap joints 6 inches and seal with manufacturers recommended tape for Radon Gas seal.
- C. Below Slab Membrane Waterproofing: Install under elevator pit slabs, where finish schedule indicates wood flooring and as noted on the drawings.

### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI'S "Manual of Standard Practice" for placing reinforcement.
- B. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- E. Weld reinforcing bars according to AWS D1.4, where indicated.
- F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- G. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

- H. Install rebar with the clearances set forth in The Building Code and CRSI which include but not limited to the following:
  - 1. Soil: 3 inches.
  - 2. Exterior Form: 1-1/2 inches.
  - 3. Interior Form: 3/4 inches.
  - 4. Adjacent Bars: 1 inch.

### 3.6 TENDON INSTALLATION

- A. Install tendons according to approved installation drawings and procedures stated in PTIS "Field Procedures Manual for Unbonded Single Strand Tendons."
- B. Tendon Supports: Provide continuous slab bolsters or bars supported on individual high chairs spaced at a maximum of 42 inches o.c. to ensure tendons remain in their designated positions during construction operations and concrete placement.
- C. Support tendons as required to provide profiles shown on installation drawings. Position supports at high and low points and at intervals not exceeding 48 inches. Ensure that tendon profiles between high and low points are smooth parabolic curves.
- D. Attach tendons to supporting chairs and reinforcement without damaging tendon sheathing.
- E. Support slab tendons independent of beam reinforcement.
- F. Maintain tendon profile within maximum allowable deviations from design profile as follows:
  - 1. 1/4 inch for member depth less than or equal to 8 inches.
  - 2. 3/8 inch for member depth greater than 8 inches and less than or equal to 24 inches.
  - 3. 1/2 inch for member depth greater than 24 inches.
- G. Maintain minimum radius of curvature of 480-strand diameters for lateral deviations to avoid openings, ducts, and embedded items. Maintain a minimum of 2 inches of separation between tendons at locations of curvature.
- H. Limit tendon bundles to five tendons. Do not twist or entwine tendons within a bundle.
- I. Maintain a minimum distance of 12 inches between center of adjacent bundles.
- J. If tendon locations conflict with non-prestressed reinforcement or embedded items, tendon placement governs unless changes are authorized in writing by Architect. Obtain Architect's approval before relocating tendons or tendon anchorages that interfere with one another.
- K. Deviations in horizontal spacing and location of slab tendons are permitted when required to avoid openings and inserts.
- L. Installation of Anchorage Devices:
  - 1. Place anchorage devices at locations shown on approved installation drawings.

2. Do not switch fixed and stressing-end anchorage locations unless authorized in writing by Architect.
  3. Attach pocket formers, intermediate anchorage devices, and stressing-end anchorage devices securely to bulkhead forms. Install stressing-end and intermediate anchorage devices perpendicular to tendon axis.
  4. Install tendons straight, without vertical or horizontal curvature, for a minimum of 12 inches behind stressing-end and intermediate anchorages.
  5. Embed intermediate anchorage devices at construction joints in first concrete placed at joint.
  6. Minimum splice length in reinforcing bars at anchorages is 24 inches. Stagger splices a minimum of 60 inches.
  7. Place fixed-end anchorage devices in formwork at locations shown on installation drawings. Support anchorages firmly to avoid movement during concrete placement.
  8. Remove loose caps on fixed-end anchorages, refill with post-tensioning coating, and re-attach caps to achieve a watertight enclosure.
- M. Maintain minimum concrete cover as follows:
1. From Exterior Edge of Concrete to Wedge Cavity: 1-1/2 inches.
  2. From Exterior Edge of Concrete to Strand Tail: 3/4 inch.
  3. Top, Bottom, and Edge Cover for Anchorage Devices: 3/4 inch.
- N. Maintain minimum clearance of 6 inches between tendons and openings.
- O. Do not install sleeves within 36 inches of anchorages after tendon layout has been inspected unless authorized in writing by Architect.
- P. Do not install conduit, pipe, or embeds requiring movement of tendons after tendon layout has been inspected unless authorized in writing by Architect.
- Q. Do not use couplers unless location has been approved by Architect.
- 3.7 SHEATHING INSPECTION AND REPAIR
- A. Inspect sheathing for damage after installing tendons. Repair damaged areas by restoring post-tensioning coating and repairing or replacing tendon sheathing.
  - B. Ensure that sheathing is watertight and there are no air voids.
  - C. Follow tape repair procedures in PTIS "Field Procedures Manual for Unbonded Single Strand Tendons."
  - D. Maximum length of exposed strand behind anchorages is as follows:
    1. Fixed End: 0 inches.
    2. Intermediate and Stressing End: 0 inches.
  - E. Cover exposed strand with sheathing repair tape to prevent contact with concrete.
  - F. Immediately remove and replace tendons that have damaged strand.

### 3.8 CONCRETE PLACEMENT

- A. Do not place concrete until placement of tendons and non-prestressed steel reinforcement has been inspected by special inspector and testing agency.
- B. Provide Special inspector and testing agency a minimum of 48 hours' notice before concrete placement.
- C. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- D. Do not add water to concrete during delivery, at Project site, or during placement.
- E. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to admixture.
- F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- G. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleed-water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- H. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- I. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
- J. Ensure that position of tendon and non-prestressed steel reinforcement does not change during concrete placement. Reposition tendons and non-prestressed steel reinforcement moved during concrete placement.
- K. Ensure that method of concrete placement does not damage tendon sheathing. Do not support pump lines, chutes, or other concrete placing equipment on tendons.

### 3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.
- B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part Portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  - 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
  - 3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch.
- D. Broom Finish: Apply a broom finish to exterior and interior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1

### 3.12 TENDON STRESSING

- A. Calibrate stressing jacks and gages at start of job and at least every six months thereafter. Keep copies of calibration certificates for each jack-and-gage pair on Project site and available for inspection. Exercise care in handling stressing equipment to ensure that proper calibration is maintained. Jack and gage should always be calibrated as a pair.
- B. Stress tendons only under supervision of qualified post-tensioning superintendent.
- C. Do not begin stressing operations until concrete strength has reached 70% of the concrete design strength as indicated by compression tests of field-cured cylinders.
- D. Complete stressing within 96 hours of concrete placement.
- E. If concrete has not reached required strength, obtain Architect's approval to partially stress tendons and delay final stressing until concrete has reached required strength.
- F. If detensioning and re-stressing of tendon is required, discard wedges used in original stressing and provide new wedges.
- G. Mark and measure elongations according to PTIS "Field Procedures Manual for Unbonded Single Strand Tendons." Measure elongations to closest 1/8 inch.
- H. Submit stressing records within one day of completion of stressing. If discrepancies between measured and calculated elongations exceed plus or minus 7 percent, resolve these discrepancies to satisfaction of Engineer of Record.
- I. Prestressing will be considered acceptable if gage pressures shown on stressing record correspond to required stressing force and calculated and measured elongations agree within 7 percent.
- J. If measured elongations deviate from calculated elongations by more than 7 percent, additional testing, re-stressing, strengthening, or replacement of affected elements may be required.

### 3.13 TENDON FINISHING

- A. Do not cut strand tails or cover anchorages until stressing records have been reviewed and approved by Structural Engineer.
- B. Cut strand tails as soon as possible after approval of elongations.
- C. Cut strand tail between 1/2 and 3/4 inch from wedges. Do not damage tendon or concrete during removal of strand tail. Acceptable methods of cutting strand tail include the following:
  - 1. Oxyacetylene flame.



2. Abrasive wheel.
  3. Hydraulic shears.
  4. Plasma cutting.
- D. Install caps and sleeves on intermediate anchorages within one day of stressing.
- E. Cut strand tails and install caps on stressing-end anchorages within one day of Architect's acceptance of elongations.
- F. Patch stressing pockets within one day of cutting strand tail. Clean inside surface of pocket to remove laitance or post-tensioning coating before installing patch material. Finish patch material flush with adjacent concrete.

### 3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
1. Provide fiber reinforcement.

### 3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. Cooperate with testing agency to facilitate the execution of its duties.
- B. Before concrete placement, special inspector will inspect the following for compliance with post-tensioning installation drawings and the Contract Documents.
- C. Location and number of tendons.
- D. Tendon profiles and cover.
- E. Installation of backup bars, hairpins, and other nonprestressed reinforcement shown on post-tensioning installation drawings.
- F. Installation of pocket formers and anchorage devices.
- G. Repair of damaged sheathing.

- H. Connections between sheathing and anchorage devices.
- I. Testing agency will record tendon elongations during stressing.
- J. Testing agency will immediately report deviations from the Contract Documents to the General Contractor and the Architect.
- K. Testing agency shall remain on site for the full duration of the pour.
- L. The testing agency shall reject all concrete that does not meet the slump requirements, temperature and/or delinquent time requirements. Non-compliant concrete shall not be placed.
- M. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
  - 2. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 3. Slump: ASTM C 143/C 143M; 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. Perform additional tests when concrete consistency appears to change.
  - 4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  - 6. Compression Test Specimens: ASTM C 31/C 31M.
  - 7. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - 8. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
  - 9. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
  - 10. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
  - 11. 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.
- N. Test results shall be reported in writing to Architect, Structural Engineer concrete manufacturer, Post Tension Engineer and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28 day tests.
- O. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

- P. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

3.16 PROTECTION

- A. Do not expose tendons to electric ground currents, welding sparks, or temperatures that would degrade component.
- B. Protect exposed components within one workday of their exposure during installation.
- C. Prevent water from entering tendons during installation and stressing.
- D. Provide weather protection to stressing-end anchorages if strand tails are not cut within 10 days of stressing the tendons.

3.17 REPAIRS

- A. Submit repair procedure to Architect for evaluation and approval.
- B. Do not proceed with repairs requiring removal of concrete unless authorized in writing by Architect.

END OF SECTION 033816

## SECTION 035300 - CONCRETE TOPPING-NORMAL WEIGHT CONCRETE

(For use on assemblies that allow normal weight concrete topping or do not require topping for assembly requirements.)

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Fiber reinforcement for concrete floor topping.

#### 1.2 SUBMITTALS

##### A. Product Data: For each type of product indicated.

##### B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for concrete floor topping.

#### 1.3 QUALITY ASSURANCE

##### A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

##### B. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting concrete floor topping performance.

##### C. Close areas to traffic during topping application and, after application, for time period recommended in writing by manufacturer.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE FLOOR TOPPING

##### A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I or II.

##### B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years'

satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/8 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
3. FL & ASH: ASTM 6618, Type F, 25% of total cementitious material content max. may be used.

C. Water: ASTM C 94/C 94M and potable.

D. Compressive Strength (28 Days): 4,000 psi; ASTM C 109/C 109M.

E. Minimum thickness: 1-1/2 inches.

## 2.2 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

## 2.3 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Monofilament or fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

## 2.4 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Moisture-Retaining Cover: Polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

- D. Clear, Waterborne, Membrane-Forming Curing Compound: Type 1, Class B, 25 percent solids content, minimum.

## 2.5 RELATED MATERIALS

- A. Semi-rigid Joint Filler: Two-component, semi-rigid, 100 percent solids, epoxy resin.
- B. Joint-Filler Strips: Asphalt-saturated cellulosic fiber.
- C. Portland Cement: ASTM C 150, Type I or II.
- D. Sand: Fine aggregate passing No. 16 sieve.
- E. Water: Potable.
- F. Acrylic-Bonding Agent: Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- G. Epoxy Adhesive: Type V, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements.

## 2.6 MIXING

- A. Bonding Slurry: Mix Portland cement with water to a thick paint consistency.
- B. Floor Topping: Mix concrete floor topping materials and water in appropriate drum-type batch machine mixer or truck mixer according to manufacturer's written instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of concrete floor topping. Proceed with application only after unsatisfactory conditions have been corrected.

### 3.2 FLOOR TOPPING APPLICATION

- A. Place concrete floor topping continuously in a single layer, tamping and consolidating to achieve tight contact with bonding surface. Do not permit cold joints or seams to develop within pour strip.
  - 1. Screed surface with a straightedge and strike off to correct elevations.
  - 2. Slope surfaces uniformly where indicated.
  - 3. Begin initial floating using bull floats to form a uniform and open-textured surface plane free of humps or hollows.

4. Trowel Finish Step 1: After applying float finish, apply first troweling and consolidate concrete by hand trowel. Continue troweling passes and restraigten until surface is free of trowel marks and uniform in texture and appearance.

a. Finish surfaces to slope and drain with no standing water locations.

5. Trowel and Fine-Broom Finish Step 2: Apply a first trowel finish to surfaces, while concrete is still plastic, slightly scarify surface with a fine broom.

B. Construction Joints: Construct joints true to line with faces perpendicular to surface plane of concrete floor topping, at locations indicated or as accepted by Architect.

C. Contraction Joints: Form weakened-plane contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete floor topping when cutting action will not tear, abrade, or otherwise damage surface and before random contraction cracks develop.

### 3.3 PROTECTING AND CURING

A. General: Protect freshly placed concrete floor topping from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying floor topping, but before float finishing.

C. Defective Topping: Repair and patch defective concrete floor topping areas, including areas that have not bonded to substrate.

### 3.4 JOINT FILLING

A. Prepare and clean contraction joints and install semi-rigid joint filler, according to manufacturer's written instructions, once topping has fully cured.

B. Install semi-rigid joint filler full depth of contraction joints. Overfill joint and trim semi-rigid joint filler flush with top of joint after hardening.

### 3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing and inspecting of completed applications of concrete floor toppings shall take place in successive stages, in areas of extent and using methods as follows:

1. Sample Sets: At point of placement, a set of 3 molded-cube samples shall be taken from the topping mix for the first 1000 sq. ft., plus 1 set of samples for each subsequent 5000 sq. ft of topping, or fraction thereof, but not less than 6 samples for each day's placement.

- Samples shall be tested according to ASTM C 109/C 109M for compliance with compressive-strength requirements.
2. Concrete floor topping shall be tested for compliance with surface flatness and levelness tolerances.
- C. Remove and replace applications of concrete floor topping where test results indicate that it does not comply with specified requirements.

END OF SECTION 035300



## SECTION 035413 - GYPSUM CEMENT UNDERLAYMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes gypsum-cement-based, self-leveling underlayment and sound control mat for application below interior hard floor coverings where used in Unit or building corridors (conditioned space).

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.
- C. Fire-Resistance Ratings: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- D. Sound Transmission Characteristics: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for STC and IIC ratings per ASTM E 90 and ASTM E 492 by a qualified testing agency.
- E. Maintain minimum ambient temperatures of 50 degrees F for 72 hours before, during and after installation of underlayment.

### PART 2 - PRODUCTS

#### 2.1 GYPSUM-CEMENT-BASED UNDERLAYMENTS

- A. Underlayment: Gypsum-cement-based, self-leveling product compliant with ASTM C 317.
  - 1. Applied in minimum uniform thickness of  $\frac{3}{4}$ " inch or 1 inch as recommended by manufacturer and as required by UL assembly, whichever is thicker, that can be feathered at edges to match adjacent floor elevations.

2. The uniform thickness of the underlayment is required to be installed at the minimum thicknesses noted by the drawings, UL assembly requirement or the minimum thickness required by the manufacturer, whichever is greater to achieve the project IIC 50 minimum required and meet manufacturer performance requirements for the system and sound mat used.
3. The thickness of the underlayment can be related to the sound mat used, the UL system selected and the floor finish to be used. All products and systems must be known and accepted prior to construction of the floor system and pouring of any gypsum underlayment. Minimum thickness is 3/4".
4. A change in any of the materials or manufacturers used can affect and restrict other selection options and affect the total system performance.

B. Products: Subject to compliance with requirements, provide one of the following:

- a. Hacker Industries, Inc.; Firm-Fill 2010 Floor Underlayment.
  - b. Maxxon Corp.: Gyp Crete 2000.
  - c. Formulated Materials: Treadstone FR25 (must obtain UL Assembly revision to allow System No. 3 using product over 23/32" structural subflooring to be used, manufacturer working on getting the UL changed, but if not changed, the Formulated Materials products cannot be used)
2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.
  3. Compressive Strength:
    - a. Units: Not less than 2000 psi at 28 days when tested according to ASTM C 109/C 109M.
    - b. Corridors and non-unit spaces; Not less than 3000 psi at 28 days when tested according to ASTM C 109/C 109M.
  4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

C. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by underlayment manufacturer. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

D. Water: Potable and at a temperature of not more than 70 deg F.

E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

F. Perimeter Isolation: Provide and install manufacturers recommended perimeter isolation strips.

- 2.2 Sound Mat: Provide sound mat products accepted as components on UL listed assemblies indicated for the total system number that is accepted by Architect and Sound Consultant during shop drawing review. Products used must be listed together in the UL system number used. Provide at all locations within the unit and corridors subject to hard flooring (i.e. ceramic tile or, vinyl flooring, etc.) Subject to compliance with requirements, provide one of the following:
- a. Ecore QTrbm, 6 mm thick acoustical underlayment
  - b. AccuQuiet 6.4 mm thick D25 sound mat or 9.5 mm thick DX38 Ultra Low Compression Sound Mat, [www.accucrete.com](http://www.accucrete.com), Ryan Kroko, [rykroko@accucrete.com](mailto:rykroko@accucrete.com), (405) 366-9500
  - c. Maxxon Corporation Acousti-Mat II (0.25" thick), Enkasonic (0.4" thick), Acousti-Mat 3 (0.8" thick) underlayment, or the HP versions of these products, [www.maxxon.com](http://www.maxxon.com), Steve Ivester, [steve@maxxonse.com](mailto:steve@maxxonse.com), (704) 622-7683
  - d. U.S. Gypsum Levelrock SAM-N25 (6 mm thick) or SAM-N40 (10 mm thick) Sound Attenuation Mat, [www.levelrock.com](http://www.levelrock.com), Jeffrey Aybar, [jaybar@alcorpmarketing.com](mailto:jaybar@alcorpmarketing.com), (678) 773-2356
  - e. Keene Building Products, Quiet Qurl 55/025 (0.25" thick), Quiet Qurl 60/040 (0.4" thick), Quiet Qurl 65/075 (0.75" thick), or the MC, MC MT, RF MT, or N MT versions of these products
  - f. Pliteq GenieMat FF, minimum 6 mm thick acoustical underlayment
  - g. Hacker Industries, Inc.; Sound Mat II.
  - h. Formulated Materials; Treadstone R1 Sound Attenuation Mat

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
  1. Treat nonmoving substrate cracks to prevent cracks from telegraphing (reflecting) through underlayment.
  2. Fill substrate voids to prevent underlayment from leaking.
- B. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust. Install underlayment reinforcement recommended in writing by manufacturer.
- C. Nonporous Substrates: For ceramic tile, quarry tile and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces.
- D. Sound Control Mat: Install sound control materials where indicated according to manufacturer's written instructions. Do not install mechanical fasteners that penetrate through the sound control materials. Provide perimeter isolation strip as indicated per the manufacturer's installation instructions and per the construction documents. Seal Isolation strips to floor or to sound attenuation mat with approved adhesive or tape.

### 3.2 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
  - 2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
  - 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 Isolation strips in approved adhesive or with approved tape to substrate or sound attenuation mat.
- D. Apply underlayment to produce uniform, level surface. Feather edges to match adjacent floor elevations.
- E. Apply underlayment and sound mat under bath tubs.
- F. Cure underlayment. Prevent contamination during application and curing processes.
- G. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- H. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.
- I. Protection from Heavy Loads: During construction, place temporary wood planking over gypsum cement underlayment wherever it will be subject to heavy wheeled or concentrated loads.

END OF SECTION 035413

## SECTION 042000 - UNIT MASONRY ASSEMBLIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Elevator enclosure walls.
- B. Trash room walls.
- C. Stair assembly walls at clubhouse
- D. Site walls
- E. Clubhouse ground level structural walls.
- F. Other locations as indicated in drawings.

#### 1.2 This Section includes the following:

- A. Concrete unit masonry.
- B. Reinforced unit masonry.
- C. Precast concrete lintels and sills.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following installed compressive strengths (f<sub>m</sub>) at 28 days.
  - 1. For Concrete Unit Masonry: As follows, based on net area:
    - a. f<sub>m</sub> = 2000 psi minimum unless noted otherwise.

#### 1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each different masonry unit, accessory, and other manufactured product specified.
- C. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

- D. Material test reports from a qualified independent testing agency, employed and paid by Contractor or manufacturer, indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
  - 1. Mortar complying with property requirements of ASTM C 270 and C 780.
  - 2. Grout mixes. Include description of type and proportions of grout ingredients.
  - 3. Masonry units.
- E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

#### 1.5 QUALITY ASSURANCE

- A. Contractor shall employ and pay a qualified professional engineer to provide a survey and inspection of foundations for compliance with dimensional tolerances.
- B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM C 1093, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- C. Preconstruction Testing: The Contractor shall engage and pay a qualified independent testing agency to perform the following preconstruction testing to establish compliance of proposed materials and construction with specified requirements:
  - 1. Concrete Masonry Unit Test: For each different concrete masonry unit indicated, test units for strength, absorption, and moisture content per ASTM C 140.
  - 2. Prism Test: For each type of wall construction indicated, test masonry prisms per ASTM E 447, Method B.
  - 3. Test grout compressive strength per ASTM C 1019.
  - 4. Perform mortar aggregate ratio test per ASTM Annex A4.
- D. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
- E. Single-Source Responsibility 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 one source and by a single manufacturer for each different product required.
- F. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- G. Material and installation shall comply with ACI 530-05 Code and Specifications.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.
- B. Store 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 avoided. Place polyethylene sheet below material.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work or prior to an anticipated rain event.
  - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 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 sills, ledges, and projections from mortar droppings.
  - 2. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
- D. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and above.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, provide one of the following:
  - 1. Concrete and Decorative Concrete Unit Masonry:
    - a. Rinker.
    - b. Florida Rock.
    - c. Castcrete.
    - d. A1 Block.

2. Portland Cement, Mortar Cement, Masonry Cement, and Lime:
  - a. Essroc Materials, Inc.
  - b. Glen-Gery Corporation.
  - c. Lafarge Corporation.
  - d. Lehigh Portland Cement Co.
  - e. Riverton Corporation (The).
3. Joint Reinforcement, Ties, and Anchors:
  - a. Dur-O-Wal, Inc.
  - b. Heckman Building Products, Inc.
  - c. Hohmann & Barnard, Inc.
  - d. Masonry Reinforcing Corp. of America.
  - e. National Wire Products Industries.
  - f. Southern Construction Products.
4. Precast Concrete Lintels and Sills:
  - a. Rinker Materials.
  - b. Cast-Crete Tampa.
  - c. Florida Rock.

## 2.2 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows for each form of concrete masonry unit required.
  1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
  2. Provide square-edged units for outside corners, except where indicated as bullnose.
  3. Provide bullnose at exposed interior outside corners.
- B. Concrete Masonry Units: ASTM C 90 and as follows:
  1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength indicated below:
    - a. 2000 psi minimum unless noted otherwise.
  2. Weight Classification: Normal weight.
  3. Provide Type II, non-moisture-controlled units.
  4. Size: Manufactured to the actual dimensions indicated on Drawings within tolerances specified in the applicable referenced ASTM specification.

## 2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.



- B. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch, use aggregate graded with 100 percent passing the No. 16 sieve.
- C. Aggregate for Grout: ASTM C 404.
- D. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.
- E. Water: Cool and Potable.

## 2.4 REINFORCING STEEL

- A. Steel Reinforcing Bars: Material and grade as follows:
  - 1. Billet steel complying with ASTM A 615 (ASTM A 615M).
- B. Deformed Reinforcing Wire: ASTM A 496, with ASTM A 153, Class B-2 zinc coating.
- C. Welded-Wire Fabric: ASTM A 185.

## 2.5 JOINT REINFORCEMENT

- A. General: Provide ladder type joint reinforcement formed from the following minimum requirements:
  - 1. Galvanized carbon-steel wire, coating class as follows:
    - a. ASTM A 153, Class B-2, for both interior and exterior walls.
- B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, horizontal cross rods spaced not more than 16 inches o.c.; with prefabricated corner and tee units.
  - 1. Wire Diameter for Side Rods: 0.1483 inch .
  - 2. Wire Diameter for Cross Rods: 0.1483 inch.

## 2.6 MISCELLANEOUS ANCHORS

- A. Postinstalled Anchors: Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Type: Chemical anchors.
  - 2. Type: Expansion anchors.
  - 3. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).
  - 4. For Post-installed Anchors in Concrete: Capability to sustain, without failure, a load equal to 4 times the loads imposed by masonry.

5. For Post-installed Anchors in Grouted Concrete Masonry Units: Capability to sustain, without failure, a load equal to 6 times the loads imposed by masonry.

## 2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Type 2, Class A, Grade 1; compressible up to 35 percent; of width and thickness indicated; formulated from the following material:
  1. Neoprene.
- B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
  1. Styrene-Butadiene Rubber Compound: ASTM D 2000, Designation M2AA-805.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

## 2.8 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.
  1. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface-acting acids, chelating, and wetting agents.
  2. For masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic and inorganic acids and special inhibitors.
  3. Available Products: Subject to compliance with requirements, provide one of the following:
    - a. 202 New Masonry Detergent; Diedrich Technologies, Inc.
    - b. 200 Lime Solv; Diedrich Technologies, Inc.
    - c. 202V Vana-Stop; Diedrich Technologies, Inc.
    - d. Sure Klean No. 600 Detergent; ProSoCo, Inc.

## 2.9 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.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for job-mixed mortar; and ASTM C 1142 for ready-mixed mortar, of types indicated below:

1. For masonry below grade, in contact with earth, and where indicated, use type indicated below:
    - a. Type: S or M.
  2. For reinforced masonry and where indicated, use type indicated below:
    - a. Type: S.
  3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions, and for other applications where another type is not indicated, use type indicated below:
    - a. Type: S.
- C. Grout for Unit Masonry: Comply with ASTM C 476. Use grout of consistency indicated or, if not otherwise indicated, of consistency (fine or coarse) at time of placement that will completely fill spaces intended to receive grout.
1. Use fine grout in grout spaces less than 2 inches in horizontal dimension, unless otherwise indicated.
  2. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, unless otherwise indicated.

## 2.10 SOURCE QUALITY CONTROL

- A. The Contractor will employ and pay a qualified independent testing agency to perform the following testing for source quality control. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C 140.

## 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 unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

### 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections of the Specifications.
- C. Leave openings for equipment to be installed before completion of masonry. After installing equipment, complete masonry to match construction immediately adjacent to the opening.
- D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- F. Provide special shapes as required.
- G. Calibrate "shovel" at the beginning of each day after breaks and lunch. Calibration shall be done using a 1 foot cubic box.

### 3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arises, do not exceed 1/4 inch in 10 feet, nor 3/8 inch in 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet, nor 1/2 inch maximum for rough openings, do not exceed, plus or minus, 1/4 inch in 10 feet from the manufacturers opening requirements.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For top surface of bearing walls, do not exceed 1/8 inch in 10 feet, nor 1/16 inch within width of a single unit.
- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed 1/2 inch in 20 feet, nor 3/4 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.
- E. Variation in Mortar-Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary bed-joint thickness from bed-joint thickness of adjacent course by more than 1/8 inch. Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch. Do not vary head-

joint thickness from adjacent head-joint thickness by more than 1/8 inch. Do not vary from collar-joint thickness indicated by more than minus 1/4 inch or plus 3/8 inch.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.
- B. Lay walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
  - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- D. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar prior to laying fresh masonry.
- E. Built-in Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, wall mounted equipment and similar items, unless otherwise indicated. Do not fill cores of frangible walls.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:
  - 1. With full mortar coverage on horizontal and vertical face shells.
  - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
  - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
  - 4. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8-inch joints.
- B. Set Precast Concrete units in full bed of mortar with vertical joints slushed full. Fill dowel, anchor, and similar holes solid. Wet stone-joint surface thoroughly before setting; for stone

surfaces that are soiled, clean bedding and exposed surfaces with fiber brush and soap powder and rinse thoroughly with clear water.

- 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 that are to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

### 3.6 STRUCTURAL BONDING OF MASONRY

- A. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.
  - 1. Provide continuity with horizontal-joint reinforcement at corners by using prefabricated "L" units in addition to masonry bonding.
- B. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:
  - 1. Provide continuity with horizontal-joint reinforcement by using prefabricated "T" units.

### 3.7 HORIZONTAL-JOINT REINFORCEMENT

- A. General: Provide continuous horizontal-joint reinforcement. 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 reinforcing a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
  - 2. Provide reinforcement in mortar joint 1 block course above and below wall openings and extending 12 inches beyond opening.
    - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:

1. Install temporary foam plastic filler in head joints and remove when unit masonry is complete.
- C. Build-in horizontal pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants."

### 3.9 LINTELS

- A. Provide precast concrete 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.
1. Provide precast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcement bars indicated or required to support loads indicated. Cure precast lintels by same method as CMU.
- B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

### 3.10 INSTALLATION OF REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
1. Construct formwork to conform to shape, line, and dimensions shown. Make 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 other temporary loads that may be placed on them during construction.
- B. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
1. Do not exceed the following pour heights for fine grout:
    - a. For minimum widths of grout spaces of 2-1/2 inches or for minimum grout space of hollow unit cells of 2-1/2 by 3 inches, pour height of 12 feet.
  2. Do not exceed the following pour heights for coarse grout:
    - a. For minimum widths of grout spaces of 2-1/2 inches or for minimum grout space of hollow unit cells of 3 by 3 inches, pour height of 12 feet.
  3. Provide cleanout holes at least 3 inches in least dimension for grout pours over 60 inches in height.
    - a. Provide cleanout holes at each vertical reinforcing bar.
    - b. At solid grouted masonry, provide cleanout holes at not more 32 inches o.c.
    - c. Provide snap-in inspection windows.

4. Do not grout vertical cells of frangible walls.
5. Install grout in 12 foot maximum lifts.
6. Consolidate fill cells using a 3/4 inch low frequency vibrator only. Do Not Rod. Reconsolidate after initial set.
7. Grout all cells below slab on grade.

C. Reinforcement:

1. Install reinforcement as indicated on drawings.
2. Tie reinforcement to maintain position in cell.
3. Provide laps as required by code.

3.11 PARGING

- A. Parge pre-dampened masonry walls, where indicated, with Type S or Type N mortar applied in 2 uniform coats to a total thickness of 3/4 inch. Scarify first parging coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp cure parging for at least 24 hours and protect until cured.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, 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 application of sealants.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to 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 nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  5. Clean brick by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised, using the following masonry cleaner:



- a. Job-mixed detergent solution.
  - b. Proprietary acidic cleaner, applied in compliance with directions of acidic cleaner manufacturer.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.
- E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

### 3.13 MASONRY WASTE DISPOSAL

- A. Recycling: Undamaged, excess masonry materials are Contractor's property and shall be removed from the Project site for his use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches in greatest dimension.
  2. Mix masonry waste with at least 2 parts specified fill material for each part masonry waste. Fill material is specified in Division 2 Section "Earthwork."
  3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 044313.16 - ADHERED MANUFACTURED STONE MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stone masonry adhered to concrete backup.
2. Stone masonry adhered to unit masonry backup.
3. Stone masonry adhered to wood framing and sheathing.

B. Related Requirements:

1. Section 042000 "Unit Masonry" for concealed flashing.

1.2 ACTION SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and manufactured product.

B. Code Acceptance: Adhered Masonry Veneer must comply with Adhered Masonry Veneer Section 1405.10 of the Florida Building Code Building 2017 Edition for material and installation requirements.

C. Install per ESR Report Requirements and Florida Building Code 2017 requirements.

D. Samples:

1. For each stone type indicated.
2. For each color of mortar required.

1.3 FIELD CONDITIONS

A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.

B. 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 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 above and will remain so until masonry has dried.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED STONE

#### A. Material Standards:

1. Maximum Absorption according to ASTM C97/C97M: 11 percent.
2. Minimum Compressive Strength according to ASTM C170/C170M: 7000 PSI.

#### B. Varieties and Sources: Subject to compliance with requirements, available stone varieties that may be incorporated into the Work include, but are not limited to, the following:

1. BASIS OF DESIGN PRODUCT: CENTURION STONE PRODUCTS, 50 VAN BUREN STREET, NASHVILLE, TN 37208 TEL: 615-256-6694 FAX: 615-726-1795 WWW.CENTURIONSTONE.COM
  - a. Veneer: Designer, Austin.
  - b. Thickness: Thickness range must be compliant with maximum thickness allowed in Florida Building Code 2017 Edition.
  - c. Weight of stone veneer must be less than the FBC maximum of 15 lbs. / sq. ft.
2. Boral Stone Products, LLC

### 2.2 MORTAR MATERIALS

#### A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.

1. Low-Alkali Cement: 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. Provide manufacturers and masonry cement products as approved by manufactured stone manufacturer and Florida Building Code 2017 Ed.

#### 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 stone masonry mortar.

1. Provide Mortar Pigments that are approved by the manufacturer that will not stain the stone.

#### E. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight.

1. Provide manufacturers and masonry cement products as approved by manufactured stone manufacturer and Florida Building Code 2017 Ed.
- F. Colored Masonry Cement Mix: Packaged blend of masonry cement and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 5 percent of masonry cement by weight.
  1. Provide manufacturers and masonry cement products as approved by manufactured stone manufacturer and Florida Building Code 2017 Ed.
- G. Aggregate: ASTM C144 and as follows:
  1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.
  2. White Aggregates: Natural white sand or ground white stone.
  3. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- H. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement mortar bed, and not containing a retarder.
  1. Provide manufacturer products as approved by manufactured stone manufacturer and Florida Building Code 2017 Ed.
- I. Water: Potable.

## 2.3 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
  1. Stainless Steel: ASTM A240/A240M, Type 304, 0.016 inch thick.
  2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
  5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
- B. Flexible Flashing: For flashing unexposed to the exterior, use the following unless otherwise indicated:
  1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive, rubberized-asphalt compound, bonded to a high-density, cross-laminated, polyethylene film to produce an overall thickness of not less than 0.040 inch.
    - 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) Carlisle Coatings & Waterproofing Inc.
- 2) Polyguard Products, Inc.

#### 2.4 MISCELLANEOUS MASONRY ACCESSORIES

- A. Cementitious Dampproofing: Cementitious formulation recommended by ILI and nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.
- B. Expanded Metal Lath: 3.4 lb/sq. yd., self-furring, diamond-mesh lath complying with ASTM C847. Fabricate from structural-quality, zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G60.

#### 2.5 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.
  1. Manufacturers: Subject to compliance with requirements and approval by manufactured stone manufacturer, 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. Dominion Restoration Products.
    - c. EaCo Chem, Inc.
    - d. Hydroclean; Hydrochemical Techniques, Inc.
    - e. PROSOCO, Inc.

#### 2.6 FABRICATION

- A. Cast stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified.
- B. Thickness of Stone: Provide manufacturer standard thicknesses and variations for stone and pattern selected meeting adhered veneer code weight limits.
- C. Adhered veneer must generally be limited in thickness because TMS 402/ACI 530/ASCE 5 limits weight of adhered veneers to 15 lb/sq. ft.

#### 2.7 MORTAR 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.
  2. Use portland cement-lime or masonry cement mortar as recommended by manufacturer and FBC code requirements.
  3. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Mortar for Stone Masonry: Comply with ASTM C270, Proportion Specification.
1. Mortar for Setting Stone: Type N.
  2. Mortar for Pointing Stone: Type N.
- C. Latex-Modified Portland Cement Setting Mortar: Proportion and mix portland cement, aggregate, and latex additive to comply with latex-additive manufacturer's written instructions.
- D. Cement-Paste Bond Coat: Mix either neat cement and water or cement, sand, and water to a consistency similar to that of thick cream.
1. For latex-modified portland cement, setting-bed mortar, substitute latex admixture for part or all of water, according to latex-additive manufacturer's written instructions.
- E. Mortar for Scratch Coat over Metal Lath: 1 part portland cement, 1/2 part lime, 5 parts loose damp sand, and enough water to produce a workable consistency.
- F. Mortar for Scratch Coat over Unit Masonry: 1 part portland cement, 1 part lime, 7 parts loose damp sand, and enough water to produce a workable consistency.
- G. 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.

### PART 3 - EXECUTION

#### 3.1 SETTING STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
1. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
  2. Pitch face at field-split edges as needed to match stones that are not field split.

- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in range of pattern selected.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Maintain uniform joint widths, except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Provide sealant joints of widths and at locations indicated.
  - 1. Keep sealant joints free of mortar and other rigid materials.
  - 2. Sealant joints are specified in Section 079200 "Joint Sealants."
- F. Install embedded flashing at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
  - 1. At stud-framed walls, extend flashing through stone masonry, up sheathing face at least 12 inches and behind weather barrier.
  - 2. At concrete backing, extend flashing through stone masonry, turned up a minimum of 6 inches, and insert in reglet.
  - 3. At lintels and shelf angles, extend flashing full length of angles but not less than 6 inches into masonry at each end.
  - 4. At sills, extend flashing not less than 4 inches at ends.
  - 5. At ends of head and sill flashing, turn up not less than 2 inches to form end dams.
  - 6. Extend sheet metal flashing 1/2 inch beyond masonry face at exterior, and turn flashing down to form a drip.
  - 7. Install metal drip edges beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face, and adhere flexible flashing to top of metal drip edge.
  - 8. Install metal flashing termination beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face, and adhere flexible flashing to top of metal flashing termination.
  - 9. Cut flexible flashing flush with wall face after completing masonry wall construction.
- G. Coat masonry with cementitious dampproofing as follows:
  - 1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.
  - 2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.

### 3.2 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet.

- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet.

### 3.3 INSTALLATION OF ADHERED STONE MASONRY VENEER

- A. Install flashing over sheathing and behind building paper or wrap and drainage material by fastening through sheathing into framing. Where over Zip Wall System, install under secondary barrier and tape flashing to Zip Wall with approved tape.
- B. Install lath over building paper or wrap and drainage material by fastening through sheathing into framing to comply with ASTM C1063 and ESR Report and Florida Building Code requirements.
- C. Install lath over unit masonry and concrete to comply with ASTM C1063 and ESR Report and Florida Building Code requirements.
- D. Install scratch coat over metal lath 3/8 inch thick to comply with ASTM C926 and as required by ESR Report and Florida Building Code requirements.
- E. Coat backs of stone units and face of scratch coat or with cement-paste bond coat, then butter both surfaces with setting mortar. Use sufficient setting mortar, so a slight excess will be forced out the edges of stone units as they are set. Tap units into place, completely filling space between units and scratch coat.

### 3.4 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
  - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
  - 5. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions.



3.5 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - 1. Do not dispose of masonry waste as fill within 18 inches of finished grade.

END OF SECTION 044313.16

## 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. This Section includes the following:
  - 1. Steel framing and supports for mechanical and electrical equipment.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Loose bearing and leveling plates.
  - 4. Steel weld plates and angles for casting into concrete not specified in other Sections.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

#### 1.4 SUBMITTALS

- A. Product Data: For the following:
  - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
  - 2. Paint products.
  - 3. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
  - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
  - 2. Provide templates for anchors and bolts specified for installation under other Sections.

3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

#### 1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code--Stainless Steel."

#### 1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

#### 1.7 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. 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.
- B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

### PART 2 - PRODUCTS

#### 2.1 METALS, GENERAL

- 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.

## 2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304 or 316L.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304 or 316L.
- D. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- E. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

## 2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

## 2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.
  - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- D. Eyebolts: ASTM A 489.
- E. Machine Screws: ASME B18.6.3.
- F. Lag Bolts: ASME B18.2.1.
- G. Wood Screws: Flat head, ASME B18.6.1.
- H. Plain Washers: Round, ASME B18.22.1.
- I. Lock Washers: Helical, spring type, ASME B18.21.1.

- J. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- K. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, 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 E 488, conducted by a qualified independent testing agency.
  - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

## 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 9 painting Sections.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Acceptable Products:
    - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
    - b. Carboline Company; Carbozinc 621.
    - c. ICI Devco Coatings; Catha-Coat 313.
    - d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
    - e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
    - f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.

- g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

## 2.6 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 true to line and level 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 where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

- G. Fabricate seams and other connections that will be 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.
  - 1. 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.

## 2.7 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 retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

## 2.8 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. 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 loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

## 2.9 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
  2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Prime shelf angles located in exterior walls with zinc-rich primer.
- E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.
- 2.10 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 plates after fabrication.
- C. Prime plates with zinc-rich primer.
- 2.11 STEEL WELD PLATES AND ANGLES
- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.
- 2.12 MISCELLANEOUS STEEL TRIM
- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated.
- D. Prime exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated with zinc-rich primer.



## 2.13 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

## 2.14 STEEL AND IRON FINISHES

- A. Hot-dip galvanize items as indicated to comply with applicable standard listed below:
  - 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
  - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. 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 bolts, 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 will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

### 3.2 INSTALLING 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.

### 3.3 INSTALLING 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 grout.
1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
  2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

## SECTION 055100 - METAL STAIRS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Pre-assembled steel stairs with pre cast concrete treads and steel risers.
2. Site poured landings.
3. Steel tube railings attached to metal stairs.
4. Steel tube handrails attached to walls adjacent to steel stairs.

#### 1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

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 loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to  $L/240$  or 1/4 inch, whichever is less.
6. Clubhouse stairs are to be designed to be supported off the masonry walls and columns, no steel columns are permitted.

C. Structural Performance of Railings: Railings 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.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For metal stairs.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Include consideration of light weight concrete on landings & breezeway decks when preparing shop drawings. Stair rise and run to be equal distances.
- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include design of attachment and detail of attachment to the structure including weather sealing.

## PART 2 - PRODUCTS

### 2.1 METALS

- A. Metal Surfaces, General: 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 A 36
- C. Steel Tubing: ASTM A 500 (cold formed).
- D. Rolled-Steel Floor Plate: ASTM A 786 rolled from plate complying with ASTM A 36 or ASTM A 283, Grade C or D.
- E. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008, structural steel, Grade 25, unless another grade is required by design loads; exposed.
- F. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011, structural steel, Grade 30, unless another grade is required by design loads.

### 2.2 FASTENERS

- A. Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

### 2.3 MISCELLANEOUS MATERIALS

- A. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer, per approved shop drawings.
- B. Apply bituminous paint to concealed surfaces of cast-metal units set into concrete.

- C. Apply clear lacquer to concealed surfaces of extruded units set into concrete.
- D. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Welded Wire Fabric: ASTM A 185, 6 by 6 inches, W1.4 by W1.4, unless otherwise indicated.
- G. Precast Concrete Treads: Normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 5000 psi and a total air content of not less than 4 percent or more than 6 percent. Reinforce with galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter wire, except for minimum wire size.

#### 2.4 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, 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.
  - 3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without impairing work.
- E. 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. Weld exposed corners and seams continuously unless otherwise indicated.
  - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

## 2.5 STEEL-FRAMED STAIRS

### A. Stair Framing:

1. Fabricate stringers of steel tubes or channels.
  - a. Provide closures for exposed ends of channel and tube stringers.
  - b. Provide cross brace strapping field welded to underside of stringers to minimize lateral movement of installed assembly.
2. Weld stringers to steel headers; weld or bolt framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.

## 2.6 POURED CONCRETE LANDINGS IN METAL PANS

- A. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight concrete with a minimum 28-day compressive strength of 5000 psi and a total air content of not less than 4 percent or more than 6 percent.
- B. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch-diameter wire; comply with ASTM A 185 and ASTM A 82, except for minimum wire size.

## 2.7 STAIR RAILINGS

- A. Comply with applicable requirements in Division 05 Section "Pipe and Tube Railings"
  1. Connect posts to stair framing by direct welding unless otherwise indicated.
- B. Steel Tube Railings: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacing's, and anchorage, but not less than that needed to withstand indicated loads.
  1. Rails and Posts: 1-1/2-inch diameter top and bottom rails and 1-1/2-inch diameter posts.
  2. Picket Infill: 1/2-inch square pickets spaced less than 4 inches o.c.
  3. Intermediate Rails Infill: 1-5/8-inch diameter.
- C. Welded Connections: Fabricate railings with 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. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.
- D. Form changes in direction of railings by bending or by inserting prefabricated elbow fittings.
- E. Form curves by bending members in jigs to produce uniform curvature without buckling.
- F. Close exposed ends of railing members with prefabricated end fittings.

- G. Provide wall returns at ends of wall-mounted handrails.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.
  - 1. Connect posts to stair framing by direct welding.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, to transfer wall bracket loads through wall finishes. Size fillers to suit wall finish thicknesses.

## 2.8 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal stairs after assembly.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Apply shop primer to uncoated surfaces of metal stair components.
- E. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.
  - 1. Galvanize stair tread angle supports, metal risers and all bolted fasteners or plates.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. 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.
- B. Install metal stairs by attaching stringers to wood framed landings (by others). Secure stringers into concrete / wood floors as indicated on the drawings and details.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
- D. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.
- E. Attach handrails to wall with wall brackets. Use type of bracket with predrilled hole for exposed bolt anchorage.



- F. Install precast concrete treads with bolted anchors to support angles.
- G. Bolt steel risers to precast treads.

### 3.2 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055100

## SECTION 061000 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
1. Framing with dimension lumber.
  2. Framing with engineered wood products.
  3. Wood furring, grounds, nailers, backing and blocking.
  4. Laminated-Veneer Lumber.

#### 1.2 SUBMITTALS

- A. Product Data for the following products:
1. Engineered wood products.
  2. Metal framing anchors.
  3. Construction adhesives.
  4. Wood pressure treatment material.
  5. Wood preservative.
- B. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee's (ALSC) Board of Review.
- C. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling.
1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
- D. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.
- E. Warranty of chemical treatment manufacturer for each type of treatment.
- F. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence the following products' compliance with building code in effect for Project.
1. Engineered wood products.
  2. Metal framing anchors.
  3. Power-driven fasteners.

- G. Submit and size the framing and wall tie-down anchors for each location.
- H. After approval from the Architect, submit engineered wood products strapping and anchors to the Building Department for approval.

### 1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood product from one source and by a single manufacturer.
- B. Fire Tested Assemblies: Provide material that complies with the components of the tested assemblies. (Determine prior to commence of construction – Approval required)

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect from weather and contact in accordance with manufacturers recommendations.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, but not limited to:
  - 1. Wood-Preservative-Treated Materials:
    - a. Borax.
    - b. Probor.
    - c. Flameguard.
    - d. Osmose, Inc.
    - e. Sunbelt Forest Products
  - 2. Metal Framing Anchors:
    - a. Simpson Strong-Tie Company, Inc.
    - b. USP Lumber Connectors.
    - c. Alpine Construction Hardware
  - 3. Power Driven Fasteners:
    - a. Hilti Corp.
    - b. ITW Ramset/Redhead.
    - c. Simpson Strong-Tie Company, Inc.

## 2.2 LUMBER, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
  - 1. NELMA - Northeastern Lumber Manufacturers Association.
  - 2. SPIB - Southern Pine Inspection Bureau.
  - 3. WCLIB - West Coast Lumber Inspection Bureau.
  - 4. WWPA - Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
  - 1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece.
- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 1. Provide dressed lumber, S4S.
  - 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

## 2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWWA C31 (lumber) and AWWA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
  - 1. Do not use chemicals containing chromium or arsenic.
  - 2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
  - 3. Treatment chemical shall be Boron (SBX) for concealed and protected applications for covered conditions. Provide amine copper quaternary (ACQ) where wood is exposed to weathering.
- B. Pressure treat above ground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. Treat indicated items and the following:
  - 1. Wood cants, bucks, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

3. Wood floor plates installed over concrete slabs or directly in contact with earth.
4. First course of wall sheathing.

- C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/ cu.ft.
- D. Complete fabrication of treated items before treatment, where possible. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

#### 2.4 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
  - a. Southern Pine.
- B. Blocking and Other Framing Not Listed Above: Provide the following grades and species:
  1. Grade: Construction or No. 2.
  2. Species:
    - a. Southern Pine.
    - b. Spruce-Pine-Fir.

#### 2.5 BOARDS

- A. Exposed Boards: Where boards will be exposed to exterior conditions in the finished work, provide the following:
  1. Moisture Content: 19 percent maximum.
  2. Species and Grade: Western Red Cedar unless noted otherwise.
- B. Concealed Boards: Where boards will be concealed by other work, provide lumber with 19 percent maximum moisture content and of following species and grade:
  1. Species and Grade: Eastern softwoods, No. 3 Common per NELMA rule. Mixed southern pine, No. 2 per SPIB rules.

#### 2.6 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

- C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, or WWPA; No. 2 grade per SPIB; or Standard grade per WCLIB or WWPA of any species.

## 2.7 STRUCTURAL-USE PANELS FOR BACKING

- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade, C-D Plugged Exposure 1, in thickness indicated or, if not otherwise indicated, not less than **23/32** inch thick.

## 2.8 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacturer.
  - 1. Where rough carpentry is exposed to weather, wall sheathing, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
  - 2. If "ACQ" preservative is used all fasteners, bolts, nails, washers, etc., shall be hot dipped galvanized or stainless steel due to corrosive effect of "ACQ".
    - a. Nails and Staples: FS FF-N-105.
    - b. Power-Driven Fasteners: CABO NER-272.
    - c. Wood Screws: ASME B18.6.1.
    - d. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)
    - e. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and flat washers.

- Low** = Use Simpson standard painted and G90 galvanized connectors as a minimum.
- Med** = Use ZMAX/HDG galvanized connectors as a minimum. Use fasteners galvanized per ASTM A153.
- High** = Use Type 304 or 316 Stainless Steel connectors and fasteners.

Connector Coating Recommendation - Structural Applications							
Environment	Untreated Wood	SBX/DOIT & Zinc Borate	ACQ-C, ACQ-D (Carbonate), CA-B & CBA-A			ACZA	Other or Uncertain
			No Ammonia	With Ammonia	Higher Chemical Content <sup>1</sup>		
Interior Dry	Low	Low	Med	Med	High	High	High
Exterior - Dry	Low	N/A <sup>2</sup>	Med	High	High	High	High
Exterior - Wet	Med	N/A <sup>2</sup>	Med <sup>3,4</sup>	High	High	High	High
Higher Exposure	High	N/A <sup>2</sup>	High	High	High	High	High
Uncertain	High	N/A <sup>2</sup>	High	High	High	High	High

1. Woods with actual retention levels greater than 0.40 pcf for ACQ, 0.41 pcf for CBA-A, or 0.21 pcf for CA-B (Ground Contact level).
2. Borate treated woods are not appropriate for outdoor use.
3. Test results indicate that ZMAX/HDG will perform adequately, subject to regular maintenance and periodic inspection. However, the nationally-approved test method used, AWWA E12-94, is an accelerated test, so data over an extended period of time is not available. If uncertain, use Stainless Steel.
4. Some treated wood may have excess surface chemicals making it potentially more corrosive. If you suspect this or are uncertain, use Stainless Steel.

## 2.9 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
  1. Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (ASTM A 653M, Z180), ASTM A 153 or coating of Type 304 stainless steel designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.

## PART 3 - EXECUTION

### 3.1 STORAGE OF MATERIAL:

- A. Store in accordance with lumber supplier or manufacturer's requirements.
- B. Loosely cover material with polyethylene sheets to protect from weather and permit ventilation. Store in such a manner as to limit the formation of mold, mildew and fungus.

### 3.2 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. CABO NER-272 for power-drive, P-nails, and allied fasteners.
  - 2. Published requirements of metal framing anchor manufacturer.
  - 3. "Recommended Nailing Schedule" of referenced framing standard and with AFPA's "National Design Specifications for Wood Construction."
  - 4. "Table 1705.1-Fastening Schedule," of the Florida Building Code.
- E. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. 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; pre-drill as required.
- F. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, in conjunction with ACQ preservative or in area of high relative humidity or used in conjunction with wood treated with ACQ.
- G. Countersink nail heads on exposed carpentry work and fill holes with wood filler.
- H. Provide wood blocking in stud walls for attachment of toilet accessories, cabinets, etc.
- I. Remediate any observed mold, mildew or fungus prior to installation of drywall.

### 3.3 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level.
- B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.
- D. Roof Deck Blocking:



1. Install 2x blocking at all hips, ridges and valleys.

### 3.4 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
  1. Firestop furred spaces of walls at each floor level and at ceiling with wood blocking or noncombustible materials, accurately fitted to close furred spaces.
- B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- size furring at 16 inches o.c., vertically unless otherwise.
  1. Provide pressure treated material when in contact with concrete or cementitious products.

### 3.5 INSTALLATION OF STRUCTURAL-USE PANELS

- A. General: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as required by FBC. **Staples are not permitted.**
- C. Provide 1/8" edge gaps between panels.
- D. Provide panel blocking where indicated.

### 3.6 WOOD SHEATHING PANELS

- A. Fasten sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails. Nails to comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least 3/8-inch from edges and ends.
- B. Install 48- by 96-inch or longer sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow 1/8-inch open space between edges and ends of adjacent units. Stagger horizontal joints, if any.
  1. At contractor's option, use Simpson PSC or equivalent for walls to maintain spacing for wall sheathing.
  2. Provide roof sheathing clips for all roof panels that do not have panel edge blocking.
- C. Install diaphragm in pattern, as indicated on the drawings.
- D. Sheathing shall not be exposed to weather for more than recommended by manufacturer. Roof sheathing shall not be exposed for more than recommended by manufacturer.

VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

END OF SECTION 061000

## SECTION 061600 - SHEATHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Wall sheathing additional layer where UL requires fire testing from both sides(See 061601 for base Zip System wall sheathing)
2. Sheathing joint and penetration treatment.
3. Subflooring
4. Roof Sheathing

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

#### 1.3 INFORMATIONAL SUBMITTALS

##### A. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.
3. Foam-plastic sheathing.

#### 1.4 QUALITY ASSURANCE

- A. All Plywood and Oriented Strand Board Panels are to be in compliance with testing as performed by APA-The Engineered Wood Association or industry accepted, nationally recognized testing agency.
- B. Should a testing agency other than APA-The Engineered Wood Association be used by a manufacturer, technical data including testing of the material is to be submitted to the Architect and Engineer of Record for approval prior to commencement of the Work.
- C. Testing for sheathing shall conform for the requirements for their type as set forth in DOC PS1, DOC PS2 or ANSI / APA PRP 210.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

### 2.2 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."

### 2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

### 2.4 ROOF SHEATHING

- A. Oriented Strand Board Roof Sheathing: US DOC PS 2-10, Exposure 1, Structural 1 sheathing.
  - 1. Nominal Thickness: Not less than 15/32 inch.
  - 2. Sheathing is to be nailed into wood framing. (see structural)

### 2.5 SUBFLOORING AND UNDERLAYMENT

- A. Oriented Strand Board Subflooring: Exposure 1.
  - 1. Span Rating: Not less than 48/24.
  - 2. Tongue-and-Groove edges.
  - 3. APA Rated.
  - 4. Nominal Thickness: Not less than 3/4 inch.
  - 5. Sheathing is to be nailed into wood framing and glued. (see structural)
- B. Plywood Subflooring: Exposure 1.
  - 1. Span Rating: Not less than 48/24.
  - 2. Tongue-and-Groove edges.
  - 3. APA Rated.

4. Nominal Thickness: Not less than 3/4 inch.
  5. Sheathing is to be nailed into wood framing and glued. (see structural)
- C. Underlayment, General: Provide gypsum concrete floor topping underlayment as indicated on Drawings per Division 03.
- 2.6 WALL SHEATHING-where additional layer is required where UL assembly requires fire testing from both sides.
- A. Glass-Mat Gypsum Sheathing: ASTM C 1177.
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. CertainTeed Corporation.
    - b. Georgia-Pacific Building Products.
    - c. National Gypsum Company.
    - d. Temple-Inland Building Products by Georgia-Pacific.
    - e. United States Gypsum Company.
  2. Type and Thickness: Type X, 5/8 inch thick.
- 2.7 STRUCTURAL-USE PANELS FOR BACKING
- A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardent panels with grade C-D Plugged Exposure 1, not less than 23/32 inch thick.
- 2.8 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 parapet and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153.
  2. For roof parapet, wall and roof sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- 2.9 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS
- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

## 2.10 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

## 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. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
  3. ICC-ES evaluation report for fastener.
- D. Coordinate wall parapet 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.

### 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 metal framing.

- b. Screw or nail to wood framing (as required by UL assembly and Structural requirements)
- c. Space panels 1/8 inch apart at edges and ends.

### 3.3 GYPSUM SHEATHING INSTALLATION

#### A. Comply with GA-253 and with manufacturer's written instructions.

- 1. Fasten gypsum sheathing to wood framing with screws.
- 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
- 3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
- 4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

#### B. Seal sheathing joints according to sheathing manufacturer's written instructions.

- 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
- 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

## SECTION 061601 - SHEATHING (HEW ZIP SYSTEM)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Combination wall sheathing, water resistive barrier and air barrier.
- 2. Self-adhering flexible flashing.
- 3. Liquid-applied flashing membrane.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry".
- 2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
- 3. For Secondary Weather Barrier required at Stucco wall system, see Section 072500 Water Resistive Air Barrier.

#### 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. For panels with integral water resistive barrier, include data on air/-moisture-infiltration protection based on testing according to referencing standards.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.
- B. Code Compliance: Comply with requirements of the following:
  - 1. Florida Building Code Compliance: Provide sheathing complying with Florida Building Code product and installation requirements for locations outside of high velocity wind zone.



1.5 DELIVERY, STORAGE, AND HANDLING

- A. Outdoor Storage: Comply with manufacturer's recommendations.
1. Set panel bundles on supports to keep off ground.
  2. Cover panels loosely with waterproof protective material.
  3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
  4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sheathing system that fail due to manufacturing defects within specified warranty period.
1. Construction Period Warranty: Manufacturer shall warrant the panels and tape for weather exposure for a period of 180 days from installation.
  2. System Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

2.2 WOOD PANEL PRODUCTS

- A. Oriented Strand Board: DOC PS 2-10.
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated. Thickness shall satisfy minimum and maximum requirements for referenced performance category.
- C. Factory mark panels to indicate compliance with applicable standard.

2.3 COMBINATION WALL SHEATHING, WATER-RESISTIVE BARRIER, AND AIR BARRIER

- A. Oriented-Strand-Board Wall Sheathing: With integral water-resistive barrier, Exposure 1 sheathing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System Wall Sheathing.
2. Span Rating, Panel Grade and Performance Category: Not less than **24/16; Rated Sheathing; 7/16 Performance Category**.
3. Edge Profile: **Square edge**.
4. Provide fastening guide on top panel surface with pre-spaced fastening symbols for 16-**inches** on centers spacing.
5. Performance Standard: DOC PS2-10 and ICC-ES ESR-1474.
6. Factory laminated integral water-resistive barrier facer.
7. Perm Rating of Integral Water-Resistive Barrier: 12-16 perms.
8. Assembly maximum air leakage of **0.0072 cfm/sq. ft.** infiltration and **0.0023 cfm/ sq. ft.** exfiltration at a pressure differential of **1.57 psf**.
9. Exposure Time: Designed to resist weather exposure for 180 days.

#### 2.4 FASTENERS

- A. General: Provide fasteners of size and type that comply with requirements specified by the authority having jurisdiction, Florida Building Code and ESR 1473 and ESR 1474 and the Structural Engineering documents.

#### 2.5 MISCELLANEOUS MATERIALS

- A. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, proprietary seam tape consisting of polyolefin film with acrylic adhesive.
  1. Basis-of-Design Product: Subject to compliance with requirements provide Huber Engineered Woods; ZIP System Seam and Flashing Tape.
  2. Thickness: 0.012 inch.
  3. Width: 3.75 inch and 6 inch as required for location used.
  4. Code Compliance: Comply with requirements of authorities having jurisdiction and ICC Evaluation Service, Inc. "AC148 - Acceptance Criteria for Flexible Flashing Materials."
  5. International Code Council (ICC), ICC-ES ESR2227 (ZIP System Tape).
  6. American Architectural Manufacturer's Association; AAMA 711.

### 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.
- 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 most restrictive of the following:
  - 1. ICC-ES 1539 or NES NER-272 for power-driven fasteners.
  - 2. Chapter 23 in the "Florida Building Code Building."
  - 3. As required in the UL Assembly indicated in the documents.
  - 4. As required in the Structural Documents.
- D. Use galvanized common wire nails unless otherwise indicated or required. 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. Install fasteners without splitting wood.
- E. Coordinate **wall** 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.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

### 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in American Wood Council, "ASD/LRFD Manual for Engineered Wood Construction," 2012 edition for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall Sheathing:
    - a. Nail o to wood framing.
    - b. Space panels **1/8 inch** apart at edges and ends.
    - c. Install fasteners **3/8 inch** to **1/2 inch** from panel edges.
    - d. Space fasteners in compliance with requirements of authority having jurisdiction, UL Fire Assembly requirements and as required in the Structural Documents.

### 3.3 SHEATHING JOINT TREATMENT

- A. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply ZIP System proprietary seam tape to joints between sheathing panels.
  - 2. Utilize ZIP System tape gun or hard rubber roller provided by manufacturer to ensure tape is completely adhered to substrates.

### 3.4 FLEXIBLE FLASHING INSTALLATION

- A. Apply ZIP System Tape flexible flashing where indicated to comply with manufacturer's written instructions.

1. After flexible flashing tape has been applied, roll surfaces with a hard rubber to ensure that flashing is completely adhered to substrates.
2. Width for Flexible Flashing: **6 inch**.

END OF SECTION 061601

## SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:

1. Wood roof trusses.
2. Wood floor trusses.
3. Wood girder trusses.
4. Wood truss bracing.
5. Metal truss accessories.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads indicated on structural plans. Comply with requirements in TPI 1.
  1. Design Loads: As indicated.
  2. Provide metal-plate-connected wood trusses capable of withstanding design loads indicated without exceeding ANSI/TPI 1 deflection limits.

#### 1.4 SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings detailing location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber to be used; splice details; type, size, material, finish, design values, and orientation and location of metal connector plates; and bearing details.
  1. Include truss Shop Drawings and installation layout drawings signed and sealed by the qualified professional engineer responsible for their preparation.
  2. Show each individual truss and label.
- C. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction showing compliance with building code in effect for Project.

- D. Provide step down end wall trusses at gable ends with verticals at 16" OC to allow installation of overhang joists and provide maximum spacing for wall finish attachments.

## 1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
  - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Comply with applicable requirements and recommendations of the following publications:
  - 1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
  - 2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
  - 3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
- D. Single-Source Responsibility for Connector Plates: Provide metal connector plates from one source and by a single manufacturer.

## PART 2 - PRODUCTS

### 2.1 DIMENSION LUMBER

- A. Lumber: DOC PS 20. Provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- B. Grade and Species: For truss chord and web members, provide dimension lumber of any species, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."
- C. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Division 06 Section Rough Carpentry.

## 2.2 METAL PRODUCTS

- A. Connector Plates: Fabricate connector plates to comply with TPI 1 from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.
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. Alpine Engineered Products, Inc.
    - b. Cherokee Metal Products, Inc.; Masengill Machinery Company.
    - c. CompuTrus, Inc.
    - d. Eagle Metal Products.
    - e. Jager Building Systems, Inc.
    - f. MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc.
    - g. Robbins Engineering, Inc.
    - h. TEE-LOK Corporation; a subsidiary of Berkshire Hathaway Inc.
    - i. Truswal Systems Corporation.
- B. Fasteners: Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
1. Nails, Brads, and Staples: ASTM F 1667.
  2. Power-Driven Fasteners: NES NER-272.
  3. Wood Screws: ASME B18.6.1.
  4. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
  5. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- C. Metal Truss Accessories: Provide truss accessories made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cleveland Steel Specialty Co.
    - b. Harlen Metal Products, Inc.
    - c. KC Metals Products, Inc.
    - d. Simpson Strong-Tie Co., Inc.
    - e. Southeastern Metals Manufacturing Co., Inc.
    - f. USP Structural Connectors.
  2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated on structural plans. Manufacturer's

published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.3 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
  - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in truss accessories according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
  - 1. Install bracing to comply with truss drawings and TPI requirements.
  - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not cut or remove truss members.
- J. Replace wood trusses that are damaged or do not meet requirements.



VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

END OF SECTION 061753

## SECTION 062023 - INTERIOR FINISH CARPENTRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Interior trim, including non-fire rated interior door frames.
2. Other Trim as may be required or indicated in drawings.

#### 1.2 SUBMITTALS

- A. Product Data: For each species and cut of lumber, trim and panel products with non-factory-applied finish.
- B. Research/Evaluation Reports: Showing that fire-retardant-treated wood complies with building code in effect for Project.

### PART 2 - PRODUCTS

#### 2.1 INTERIOR TRIM

##### A. Moldings for Opaque Finish (Painted Finish):

1. Softwood Moldings:
  - a. Species and Grade: Pre-primed paint grade wood.
  - b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
2. Finger Jointing: Allowed.
3. Profiles in Units:
  - a. Baseboard – 9/16" x 3-1/2" Finger joint pine
  - b. Casings – 11/16" x 2-1/4" Finger joint pine
  - c. Window sill – Granite sill, Provide inverted base trim on underside, mitered back to wall on ends. Match width of window.
  - d. Under countertops – 11/16" x 1-3/8"
  - e. Shoe molding – 7/16" x 3/4" Mahogany/Luan
4. Profiles in Common areas
  - a. Baseboard – 9/16" x 5 1/4" Finger joint pine
  - b. Casings – 11/16" x 2-1/4" Finger joint pine
  - c. Window sill – Granite sill, Provide inverted base trim on underside, mitered back to wall on ends. Match width of window.

- d. Under countertops – 11/16” x 1-3/8”
- e. Shoe molding – 7/16” x 3/4” Mahogany/Luan
- f. Chair rail molding – 9/16” x 2-1/4”

- B. Closet Specialties: Prefinished vinyl wire; per plans, see specification for closet specialties.
  - 1. Mount at heights as required to meet UFAS requirements.
  - 2. Provide blocking behind mounting supports or fasten direct to studs, do not fasten into drywall only.

## 2.2 MISCELLANEOUS MATERIALS

- A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- B. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

### 3.2 INSTALLATION

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Countersink fasteners, fill surface flush, and sand unless otherwise indicated.
  - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
- B. Install standing and running trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long except where necessary. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.
- C. Replace finish carpentry that is damaged or does not comply with requirements. Finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

- D. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up finishes to restore damaged or soiled areas.

END OF SECTION 062023

## SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes self-adhering modified bituminous sheet waterproofing for basic use (above grade) vertical and horizontal applications.
- B.
  - 1. Example locations:
    - a. Over wood floor decking at corridors and breezeways.
    - b. Over wood floor decking at stair landings.
    - c. Against wood sheathing at inside/outside wall corners.
    - d. Against wood sheathing at bottom band.
    - e. Against wood sheathing at openings.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material description, and tested physical and performance properties of waterproofing.
  - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

#### 1.4 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

## 1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
1. Warranty Period: Ten **(10)** years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from single manufacturer.

### 2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil nominal thickness, self-adhering sheet, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner.
1. Products: Subject to compliance with requirements, Provide one of the following:
    - a. CETCO Building Materials Group, a subsidiary of AMCOL International Corp.; Envirosheet.
    - b. Grace, W.R., & Co. – Conn.; Bituthene 3000/Low Temperature (for vertical and horizontal sheet waterproofing) or Select, Ultra or Ice and Water Shield for self-adhered sheet roofing underlayment waterproofing.
    - c. Henry Company; Blueskin WP 100/200.
    - d. Meadows, W.R. Inc.; SealTight Mel-Rol.
    - e. Polyguard Products, Inc.; Polyguard 650.
    - f. Protecto Wrap Company; PW 100/60.
    - g. Tamko Building Products, Inc.; TW-60.
  2. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

### 2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
- B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.

- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

### 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 waterproofing.
  - 1. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surface not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Prepare, fill, prime and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- D. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

#### 3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- A. Prepare surfaces and install modified bituminous sheets according to waterproofing manufacturer's written instructions and recommendations in ASTM D 6135.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Re-prime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- D. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.
- E. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- F. Seal edges of sheet-waterproofing terminations with mastic.
- G. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing and prior to installation of adjacent/overlapping barriers or underlayments.
- H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

#### 3.4 FIELD QUALITY CONTROL

- A. Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish daily reports to Architect.

#### 3.5 PROTECTION, REPAIR, AND CLEANING

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071326



## SECTION 071616 - CRYSTALLINE WATERPROOFING

### 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 crystalline waterproofing at concrete pits (at penetrations and repairs) and other below grade joints or cracks.
- B. Section includes Additive Products added to concrete at the time of batching for the elevator pit.
- C. Other job poured concrete where specified.
- D. Related Requirements:
  - 1. Section 033000 "Cast-in-Place Concrete" for the finishing of concrete walls and slabs to receive waterproofing.

#### 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 construction details, material descriptions, and installation instructions.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Applicator.
- B. Product Certificates: For each type of waterproofing, patching, and plugging material.
- C. Product Test Reports: For each product formulation, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Field quality-control reports.

## 1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm experienced in applying crystalline waterproofing similar in material, design, and extent to that indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and that employs workers trained and approved by manufacturer.

## 1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit crystalline waterproofing to be performed according to manufacturer's written instructions.
- B. Proceed with waterproofing work only after pipe sleeves, vents, curbs, inserts, drains, and other projections through the substrate to be waterproofed have been completed. Proceed only after substrate defects, including honeycombs, voids, and cracks, have been repaired to provide a sound substrate free of forming materials, including reveal inserts.
- C. Ambient Conditions: Proceed with waterproofing work only if temperature is maintained at 40 deg F or above during work and cure period, and space is well ventilated and kept free of water.

## PART 2 - PRODUCTS

### 2.1 WATERPROOFING MATERIALS

- A. Surface Applied Crystalline Waterproofing: Prepackaged, gray-colored proprietary blend of Portland cement, specially treated sand, and active chemicals that, when mixed with water and applied, penetrates into concrete and concrete unit masonry and reacts chemically with the byproducts of cement hydration in the presence of water to develop crystalline growth within substrate capillaries to produce an impervious, dense, waterproof substrate; with properties complying with or exceeding the criteria specified below.
  - 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. Xypex Chemical Corporation.
  - 2. Water Permeability: Maximum zero for water at 30 feet when tested according to COE CRD-C 48.
  - 3. Compressive Strength: Minimum: See Structural Drawings, at 28 days when tested according to ASTM C 109/C 109M.

2.2 Concrete Additive Products: Blended into the concrete mix at the time of batching to waterproof and protect the concrete.

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. Xypex Chemical Corporation.
- b. Xypex Admix C-500/C500NF, C-1000/C-1000NR: selection based on concrete mix and project conditions.

2.3 ACCESSORY MATERIALS

A. Patching Compound: Factory-premixed cementitious repair mortar, crack filler, or sealant recommended by waterproofing manufacturer for filling and patching tie holes, honeycombs, reveals, and other imperfections; and compatible with substrate and other materials indicated.

B. Plugging Compound: Factory-premixed cementitious compound with hydrophobic properties and recommended by waterproofing manufacturer; resistant to water and moisture but vapor permeable for all standard applications (vertical, overhead, and horizontal surfaces not exposed to vehicular traffic); and compatible with substrate and other materials indicated.

C. Water: Potable.

2.4 MIXES

A. Applied Crystalline Waterproofing: Add prepackaged dry ingredients to water according to manufacturer's written instructions. Mix together with mechanical mixer or by hand to required consistency.

B. Concrete Additive Waterproofing: Added to concrete at the time of batching, batch mix must be approved by the Waterproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for suitable conditions where waterproofing is to be applied.

B. Proceed with application only after unsatisfactory conditions have been corrected.

C. Notify Architect in writing of active leaks or defects that would affect system performance.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions.
- B. Protect other work from damage caused by cleaning, preparation, and application of waterproofing. Provide temporary enclosure to ensure adequate ambient temperatures and ventilation conditions for application.
- C. Do not allow waterproofing, patching, and plugging materials to enter reveals or annular spaces intended for resilient sealants or gaskets, such as joint spaces between pipes and pipe sleeves.
- D. Stop active water leaks with plugging compound.
- E. Repair damaged or unsatisfactory substrate with patching compound.
  - 1. At holes and cracks 1/16 inch wide or larger in substrate, remove loosened chips and cut reveal with sides perpendicular to surface, not tapered, and minimum 1 inch deep. Fill reveal with patching compound flush with surface.
- F. Surface Preparation: Remove efflorescence, chalk, dust, dirt, mortar spatter, grease, oils, paint, curing compounds, and form-release agents to ensure that waterproofing bonds to surface.

### 3.3 APPLICATION

- A. General: Comply with waterproofing manufacturer's written instructions for application and curing.
- B. Curing for applied products: Moist-cure waterproofing for three days immediately after final coat has set, followed by air drying, unless otherwise recommended in writing by manufacturer.

END OF SECTION 071616

## SECTION 071700 - BENTONITE WATERPROOFING

### 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. Bentonite waterproofing at below grade walls of elevator pit.

- B. Related Sections:

- 1. Division 03 Section "Cast-in-Place Concrete" for forms, waterstops, and concrete placement.
  - 2. Division 31 Section "Earth Moving" for excavating and backfilling.
  - 3. Division 07 Section 071616 "Crystalline Waterproofing".

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, or required by manufacturer. Include and manufacturer's written installation instructions.
- B. Shop Drawings: Show installation details for interface with other work.
- C. Samples: For each of the following products, in sizes indicated:
  - 1. Waterproofing: 6 inches square.
  - 2. Termination accessories, 12" length.
- D. Material Certificates: For each type of bentonite waterproofing, from manufacturer.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for bentonite waterproofing.
- F. Field quality-control reports.
- G. Warranty: Sample of special warranty.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain bentonite waterproofing system from single source from single manufacturer. Obtain accessory products used with bentonite waterproofing from sources acceptable to bentonite waterproofing manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original unopened and undamaged containers.
- B. Store materials in a dry, well-ventilated space.
- C. Remove and replace bentonite materials that have been prematurely exposed to moisture.

#### 1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit bentonite waterproofing to be installed according to manufacturers' written instructions and warranty requirements.
  - 1. Do not apply waterproofing materials to surfaces where ice or frost is visible. Do not apply bentonite waterproofing materials in areas with standing water.
  - 2. Placing bentonite clay products in panel or composite form on damp surfaces is acceptable if approved in writing by manufacturer.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and Installer agree(s) to repair or replace components of bentonite waterproofing system that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 GEOTEXTILE/BENTONITE SHEETS

- A. Geotextile/Bentonite Waterproofing: Minimum of 1.0 lb/sq. ft. of bentonite clay granules between two layers of geotextile polypropylene fabric, one woven and one nonwoven, needle punched and heat fused together.
  - 1. Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, the following:

- a. Carlisle Coatings & Waterproofing; CCW MiraCLAY.
- b. CETCO; Voltex.

2. Grab Tensile Strength: 95 lbf according to ASTM D 4632.

## 2.2 COMPOSITE HDPE/BENTONITE MEMBRANE

- A. Coated Panels: 3/16-inch-thick, corrugated kraft-paper panels specially coated to resist premature hydration due to incidental moisture; filled with a minimum of 1.0 lb/sq. ft. of bentonite.

## 2.3 INSTALLATION ACCESSORIES

- A. Granular Bentonite: Sodium bentonite clay containing a minimum of 90 percent montmorillonite (hydrated aluminum silicate), with a minimum of 90 percent passing a No. 20 sieve.
- B. Bentonite Mastic: Trowelable consistency, bentonite compound, specifically formulated for application at joints and penetrations.
- C. Granular Bentonite Tubes: Manufacturer's standard 2-inch-diameter, water-soluble tube containing approximately 1.5 lb/ft. of bentonite; hermetically sealed; designed specifically for placing on wall footings at line of joint with exterior base of wall.
- D. Termination Bar: Extruded-aluminum or formed-stainless-steel bars with upper flange to receive sealant.
- E. Plastic Protection Sheet: Polyethylene sheeting complying with ASTM D 4397; thickness recommended by waterproofing manufacturer to suit application but at least 10 mils thick.
- F. Cement Grout Patching Material: Manufacturer's recommended grout mix compatible with substrate being patched.
- G. Masonry Fasteners: Case-hardened nails or hardened-steel, powder-actuated fasteners. Depending on manufacturer's written requirements, provide 1/2- or 1-inch- diameter washers under fastener heads.
- H. Sealants: As recommended in writing by waterproofing manufacturer. Comply with requirements specified in Division 07 Section "Joint Sealants."
- I. Tapes: Waterproofing manufacturer's recommended tape for joints between sheets, membranes, or panels.
- J. Adhesive: Water-based adhesive used to secure waterproofing to both vertical and horizontal surfaces.
- K. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners, and as follows:

1. Thickness: 1/8 inch, nominal, for vertical applications; 1/4 inch, nominal, elsewhere.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate preparations affecting performance of bentonite waterproofing.
- B. Verify that substrate is complete and that work that will penetrate waterproofing is complete and rigidly installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Coordinate work in the vicinity of waterproofing to ensure proper conditions for installing the waterproofing system and to prevent damage to waterproofing after installation.
- B. Formed Concrete Surfaces: Remove fins and projections. Fill voids, rock pockets, form-tie holes, and other defects with bentonite mastic or cement grout patching material according to manufacturer's written instructions.
- C. Horizontal Concrete Surfaces: Remove debris, standing water, oily substances, mud, and similar substances that could impair the bonding ability of concrete or the effectiveness of waterproofing. Fill voids, cracks greater than 1/8 inch, honeycomb areas, and other defects with bentonite mastic or cement grout patching material according to manufacturer's written instructions.
- D. Excavation Support and Protection System: If water is seeping, use plastic protection sheets or other suitable means to prevent wetting the bentonite waterproofing. Fill minor gaps and spaces 1/8 inch wide or wider with appropriate filling material. Cover or fill large voids and crevices with cement mortar according to manufacturer's written instructions.

#### 3.3 INSTALLATION, GENERAL

- A. Install waterproofing and accessories according to manufacturer's written instructions.
  1. Apply granular bentonite around penetrations in horizontal surfaces and changes in plane according to manufacturer's details in preparation for granular bentonite tubes and mastic.
  2. Apply granular bentonite tubes, bentonite mastic, or both at changes of plane, construction joints in substrate, projections, and penetrations.
- B. Apply granular bentonite tubes continuously on footing against base of wall to be waterproofed according to manufacturer's written instructions.



- C. Protect waterproofing from damage and wetting before and during subsequent construction operations. Repair punctures, tears, and cuts according to manufacturer's written instructions.
- D. Install protection course before backfilling or placing overburden, as recommended by waterproofing manufacturer.

#### 3.4 GEOTEXTILE/BENTONITE SHEET INSTALLATION

- A. Install a continuous layer of waterproofing sheets directly against concrete to be waterproofed. Lap ends and edges a minimum of 4 inches on horizontal and vertical substrates. Stagger end joints between sheets a minimum of 24 inches. Fasten seams by stapling to adjacent sheet or nailing to substrate.

#### 3.5 FIELD QUALITY CONTROL

- A. Inspection: Arrange for manufacturer's representative to inspect completed waterproofing installation before covering with other construction and provide written report that installation complies with manufacturer's written instructions. Provide reports to Architect.
  - 1. Remove and replace applications of bentonite waterproofing where inspection indicates that it does not comply with specified requirements.

END OF SECTION 071700

## SECTION 072100 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Glass-fiber blanket.
3. Mineral-wool blanket.
4. Blown in loose fill insulation

#### 1.2 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

#### 1.3 INFORMATIONAL SUBMITTALS

- ##### A. Product test reports.
- ##### B. Research reports.

### PART 2 - PRODUCTS

#### 2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- ##### A. Extruded polystyrene boards in this article are also called "XPS boards."
- ##### B. Extruded Polystyrene Board: ASTM C 578, Type IV, 15-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, but are not limited to the following:
    - a. Owens Corning Basis of Design
  2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
  3. Must meet project insulation requirements and be dense enough to be installed under furring.

## 2.2 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
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. CertainTeed Corporation.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Owens Corning.

## 2.3 MINERAL-WOOL BLANKET

- A. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
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. Johns Manville; a Berkshire Hathaway company.
    - b. Thermafiber, Inc.; an Owens Corning company.

## 2.4 BLOWING INSULATION

- A. Thermal Blowing Insulation: Basis of Design is CertainTeed InsulSafe SP Fiberglass Blowing Insulation. Fiberglass blowing insulation for open attics, enclosed walls, and floor/ceilings assemblies. Complies with ASTM C 764; mineral fiber loose fill insulation Type 1, Pneumatic application, Fire Hazard Classification: ASTM E 84, Maximum Flame Spread Index; 5, Maximum Smoke Developed Index; 5, Noncombustibility: ASTM E 136, passes.
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. Basis of Design, CertainTeed Corp., Insulation Group, which is located at: 20 Moores Road; Malvern, PA 19355; Toll Free Tel: 800-233-8990; Email: [requestinfo \(building.solutions@saint-gobain.com\)](mailto:requestinfo@building.solutions@saint-gobain.com); Web: [www.certainteed.com/insulation](http://www.certainteed.com/insulation)
  2. Applications:
    1. Open Attic Application at all Residential and Clubhouse open truss roofs:
      - a. Thermal Resistance: R of 30. Minimum Installed Thickness: 11.50 inches.

## 2.5 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
  - 1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
  - 2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.
- C. 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.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.
- D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

## PART 3 - EXECUTION

### 3.1 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. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. 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.

### 3.2 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
  5. For framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to studs.
  6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
    - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- B. Blown Insulation-Install in accordance with manufacturers' recommendations in thicknesses required to achieve project insulation requirements.
1. Provide baffles to keep ventilation from soffits clear of insulation.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

END OF SECTION 072100

## SECTION 072500 - WEATHER RESISTIVE BARRIERS/AIR BARRIER

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Flexible flashing at secondary barrier
2. Secondary Felt Barrier at Stucco Finish
3. See Section 061601 Sheathing (HEW Zip System) for Primary Weather resistive and Air Barrier

- B. Work under this scope of work is defined as secondary weather resistive barrier being placed over Zip System sheathing over wood framing as applicable.

#### 1.2 ACTION SUBMITTALS

1. Product Data: For each type of product. Submit installation instructions, shop drawings, and certificate letter(s) for compatibility with adjacent materials (including specified sealant products). Include all related products to be used or attached to the Water Resistive Barrier/Air Barrier.

### PART 2 - PRODUCTS

#### 2.1 WEATHER RESISTIVE BARRIER

- A. The water resistive barrier shall be system based. All products shall be compatible.

##### B. Secondary Barrier

1. MANUFACTURER: Fortifiber® Building Systems Group, 1-800-773-4777
2. Material: Vapor Permeable Weather-Resistive Barriers: Single layer, 1-Ply asphalt saturated kraft Grade D breather type sheathing paper.
  1. Types:
    - a. Premier: Super Jumbo Tex 60 Minute
  3. Reference Standard; Federal Specification UU-B-790a, Type 1, Grade D, Style 2.
  4. Moisture Vapor Transmission: 35 grams minimum; ASTM E 96.
  5. Water Resistance: 60 minutes minimum (premier); ASTM D 779.

#### 2.2 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product manufactured by, or approved by Water Resistive Barrier / Air Barrier manufacturer as chemically

compatible with wrap and wrap accessories and complying with manufacturer's warranty requirements, and consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, or spun bonded polyolefin to produce an overall thickness of not less than 0.025 inch.

### PART 3 - EXECUTION

#### 3.1 WATER-RESISTIVE SECONDARY BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed and sealed according to manufacturers' recommendations.
- B. Water Resistive Barrier / Air Barrier: Comply with manufacturer's written instructions as minimum requirements.
  - 1. Prior to installation of an exterior finish system, the water resistive barrier shall be completely sealed to prevent the intrusion of any air or water.
  - 2. Inside and Outside corners shall be wrapped with flexible flashing a minimum of 12" horizontally each direction from corner.
  - 3. Seal seams, edges, fasteners, and penetrations with tape.
  - 4. Extend into jambs of openings and seal corners with tape.
  - 5. Repair any damage or tears as approved by manufacturer
  - 6. Flash dissimilar material joints as required and detailed with Self Adhered Sheet Waterproofing, manufacturer must be approved by Water Resistive Barrier / Air Barrier manufacturer.
  - 7. Repair any damage prior to proceeding as recommended and approved by manufacturer
  - 8. If a fastener is removed, the resultant fastener hole must be repaired prior to proceeding.

#### 3.2 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
  - 1. Prime substrates as recommended by flashing manufacturer.
  - 2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
  - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
  - 4. Lap water-resistive barrier over flashing at heads of openings.
  - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

6. Flash all intersections or joints within the system, at joints, at flashing or at changes of materials to provide a shingled weather tight seal. Roll tape to substrate(s) with hard faced roller.
7. The building is to be considered water and air tight after the installation of the water resistive barrier / air barrier before the installation of the final building such as stucco or other exterior skin material.

END OF SECTION 072500



## SECTION 073113 - ASPHALT SHINGLES

### 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 granular surfaced asphalt shingle roofing, underlayment, eave, valley, and ridge protection, and metal flashings.
- B. All work under this section must comply with and be registered under the Florida Product Approval and have Miami Dade approval and meet the requirements of the Florida Building Code (FBC), herein referred to as Code. Particular attention should be given to the Wind Zone requirements of the FBC for the location in which the Project is located, Orange County, FL.
- C. Asphalt shingles.
  - 1. Underlayment.
  - 2. Ridge vents.
  - 3. Metal flashing and trim.

#### 1.3 DEFINITION

- A. Roofing Terminology: See ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

#### 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. Florida Product Approval and Miami Dade Approval.
- C. Samples: For each exposed product and for each color and texture specified.
  - 1. Asphalt Shingles: Full size.
  - 2. Ridge and Hip Cap Shingles: Full size.
  - 3. Ridge Vent: 12-inch-long Sample.

4. Exposed Valley Lining: 12 inches square.

D. Samples for Initial Selection: For each type of asphalt shingle indicated.

1. Include similar Samples of accessories involving color selection.

#### 1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each type of asphalt shingle and underlayment product indicated, for tests performed by a qualified testing agency.

C. Product data and test Reports: submit data indicating material characteristics, limitations and ICC-ES evaluation reports. Submit Florida Product Approval indicating compliance with project requirements.

D. Evaluation Reports: For synthetic underlayment and high-temperature, self-adhering sheet underlayment, from ICC-ES or other testing and inspecting agency acceptable to authorities having jurisdiction, indicating that product is suitable for intended use under applicable building codes.

E. Sample Warranty: For manufacturer's warranty.

#### 1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For asphalt shingles to include in maintenance manuals.

#### 1.8 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Fire-Resistance Characteristics: ASTM E 108 or UL 790, Class A. Identify products with appropriate markings of testing and inspecting agency acceptable to authorities having jurisdiction.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture according to manufacturer's written instructions.

B. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.

C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

- D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

#### 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

#### 1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

- 1. Failures include, but are not limited to, the following:

- a. Manufacturing defects.

- 2. Material Warranty Period: 25 years from date of Substantial Completion, prorated, with first 10 years nonprorated.
- 3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 130 mph for 10 years from date of Substantial Completion.
- 4. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for 10 years from date of Substantial Completion.
- 5. Workmanship Warranty Period: 10 years from date of Substantial Completion.

- B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of asphalt-shingle roofing that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance according to ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

#### 2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Scope of work (shingles, underlayment, and fasteners) must have Miami Dade and Florida Product Approval to function as a system.

- B. Laminated-Strip Asphalt Shingles: ASTM D3462/D3462M, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
1. Manufacturers: Subject to compliance with requirements and Owner/Architect Approval, provide one of the following or approved equal:
    - a. Basis of Design: Owens Corning TruDefinition Duration Algae Resistant, FPA #10674.1, alternate manufacturers must meet aesthetic and performance requirements to be considered.
    - b. Atlas Roofing Corporation
    - c. Certaineed Corporation
    - d. Tamko Roofing Products, Inc.
  2. Style: Architectural Shingle with shadow line and unequal width tabs.
  3. Strip Size: Manufacturer's standard.
  4. Algae Resistance: Granules resist algae discoloration.
  5. Impact Resistance: UL 2218, Class 4.
  6. Fire Resistance: Class A.
  7. Low Slope Roofing Approval: 2:12 slope approval without affecting performance or warranty.
  8. Color and Blends: As selected by Architect from manufacturer's full range.

### 2.3 UNDERLAYMENT MATERIALS

- A. Glass-Reinforced Felt: ASTM D6757, glass-reinforced, asphalt-saturated organic felt.
1. Basis of Design: Fiberglass TM Reinforced Felt Underlayment. FPA #12536.1.
  2. Other manufacturers may be acceptable pending approval by roofing shingle manufacturer and acceptable Florida Product Approval.
- B. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 40-mil- thick; with slip-resisting, polymer-film-reinforced or glass-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive; with release backing; cold applied; and evaluated and documented to be suitable for use for intended purpose under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.
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 subject to acceptance by roofing manufacturer:
    - a. ATAS International, Inc.
    - b. CertainTeed Corporation.
    - c. GAF.
    - d. Owens Corning. (Basis of Design)
    - e. Tamko Building Products, Inc.
  2. Thermal Stability: Stable after testing at 240 deg F according to ASTM D1970/D1970M.
  3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F according to ASTM D1970/D1970M.

## 2.4 RIDGE VENTS

### A. RIDGE /HIP VENTS

1. Provide manufactured product style and sizes indicated on drawings.
2. Manufacturer: Owens Corning, VentSure 4 Foot Strip Vent with weather PROtector Moisture Barrier.
3. Ridge Vents are calculated to avoid off ridge venting, therefore care must be taken for any alternate ridge vent system to provide the same clear area as a minimum.
4. The specified Ridge Vent is approved for use on hips, any alternate that may be suggested will be required to provide the same approval for use on hip.

## 2.5 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D4586, Type II, asbestos free.

B. Roofing Nails: ASTM F1667; aluminum, stainless-steel, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- diameter, sharp-pointed, with a minimum 3/8-inch-diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through OSB or plywood sheathing. Fasteners and spacing must meet Florida Product Approval and Miami Dade requirements.

1. Shank: Barbed.
2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Felt-Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter.

D. Synthetic-Underlayment Fasteners: As recommended in writing by synthetic-underlayment manufacturer for application indicated.

## 2.6 METAL FLASHING AND TRIM

A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."

1. Sheet Metal: Anodized prefinished aluminum.

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

1. Apron Flashings: Fabricate with lower flange a minimum of 5 inches over and 5 inches beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.
2. Cricket or Backer Flashings: Fabricate with concealed flange extending a minimum of 18 inches beneath upslope asphalt shingles and 6 inches beyond each side of chimney and 6 inches above the roof plane.

3. Drip Edges: Fabricate in lengths not exceeding 10 feet with 2-inch roof-deck flange and minimum 1-1/2-inch fascia flange (see drawings for locations of deeper drip edge) with 3/8-inch drip at lower edge.
- C. Vent Pipe Flashings: ASTM B749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches from pipe onto roof.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provisions have been made for flashings and penetrations through asphalt shingles.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Single-Layer Felt Underlayment at slopes 4/12 or greater: Install on roof deck parallel with and starting at the eaves. Lap sides a minimum of 2 inches over underlying course. Lap ends a minimum of 4 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with felt underlayment nails.
  1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than 3 inches in direction to shed water. Lap ends of felt not less than 6 inches over self-adhering sheet underlayment.
  2. Install fasteners at no more than 36 inch o.c.
- C. Double-Layer Felt Underlayment at slopes lower than 4/12: Install on roof deck parallel with and starting at the eaves. Install a 19-inch- wide starter course at eaves and completely cover with full-width second course. Install succeeding courses lapping previous courses 19 inches in shingle fashion. Lap ends a minimum of 6 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with felt-underlayment nails.

1. Apply a continuous layer of asphalt roofing cement over starter course and on felt-underlayment surface to be concealed by succeeding courses as each felt course is installed.
  2. Terminate underlayment extended up not less than 4 inches against sidewalls, curbs, chimneys, and other roof projections.
  3. Install fasteners at no more than 36 inch o.c.
  4. Extend over valleys and hips to lap.
- D. Synthetic Underlayment: Install on roof deck parallel with and starting at the eaves. Lap sides and ends and treat laps as recommended in writing by manufacturer. Stagger end laps between succeeding courses at interval recommended in writing by manufacturer. Fasten according to manufacturer's written instructions. Cover underlayment within period recommended in writing by manufacturer.
1. Install in double layer on roofs sloped at less than 4:12.
  2. Extend over valleys and hips to lap.
- E. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.
1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.
  2. Valleys: Extend from lowest to highest point 18 inches on each side.
  3. Hips: Extend 18 inches on each side.
  4. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
  5. Sidewalls: Extend beyond sidewall 18 inches, and return vertically against sidewall not less than 4 inches.
  6. Chimneys and Other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches, and return vertically against penetrating element not less than 4 inches.
  7. Roof Slope Transitions: Extend 18 inches on each roof slope.

### 3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
- B. Step Flashings: Install with a headlap of 2 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.
- C. Cricket or Backer Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.
- D. Rake Drip Edges: Install rake drip-edge flashings over underlayment and fasten to roof deck.

- E. Eave Drip Edges: Install eave drip-edge flashings below underlayment and fasten to roof sheathing.
- F. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

### 3.4 ASPHALT-SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
- B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip with tabs removed at least 7 inches wide with self-sealing strip face up at roof edge.
  - 1. Extend asphalt shingles 3/4 inch over fasciae at eaves and rakes.
  - 2. Install starter strip along rake edge.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Fasten asphalt-shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.
  - 1. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots or as required by manufacturer for warranty and wind performance.
  - 2. When ambient temperature during installation is below 50 deg F, seal asphalt shingles with asphalt roofing cement spots.
- E. Woven Valleys: Extend succeeding asphalt-shingle courses from both sides of valley 12 inches beyond center of valley, weaving intersecting shingle-strip courses over each other. Use one-piece shingle strips without joints in valley.
  - 1. Do not nail asphalt shingles within 6 inches of valley center.
- F. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.
- G. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
  - 1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

### 3.5 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:



1. Owner: <Insert name of Owner>.
  2. Address: <Insert address>.
  3. Building Name/Type: <Insert information>.
  4. Address: <Insert address>.
  5. Area of the Work: <Insert information>.
  6. Acceptance Date: <Insert date>.
  7. Warranty Period: <Insert time>.
  8. Expiration Date: <Insert date>.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:
    - a. Lightning;
    - b. Peak gust wind speed exceeding 150 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 the 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 the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.
  4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty shall not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the 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 the work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and 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 the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

END OF SECTION 073113

## SECTION 074600 – FIBER CEMENT SOFFIT AND TRIM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Fiber-cement soffit.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Product Certificates: For each type of soffit, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement soffit.
- D. Research/Evaluation Reports: For each type of siding required, indicating compliance with requirements of the authorities having jurisdiction.
- E. Maintenance Data: For each type of soffit and related accessories to include in maintenance manuals.
- F. Warranty: Sample of special warranty.

#### 1.3 QUALITY ASSURANCE

- A. Labeling: Provide fiber-cement materials that are tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.
- B. Source Limitations: Obtain soffit, including related accessories, from single source from single manufacturer.
- C. Store materials in a dry, well-ventilated, weathertight place.
- D. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

#### 1.4 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair soffit that fail(s) in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Structural failures including cracking, deforming.
2. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 FIBER-CEMENT SOFFIT

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
  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. Cemlank.
    - b. CertainTeed Corp.
    - c. GAF Materials Corporation.
    - d. James Hardie. (Basis of Design) HardiSoffit
    - e. Nichiha Fiber Cement.
- B. Pattern: 24" or as indicated, wide sheets with smooth texture.
- C. Ventilation: Provide perforated soffit. Attic Ventilation requirements are based on the HardiSoffit vented area. Any alternate that may be suggested must provide the same or more vented area to be considered.
- D. Factory Priming: Manufacturer's standard acrylic primer.

### 2.2 ACCESSORIES

- A. Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
  1. Provide accessories made from same material as adjacent siding unless otherwise indicated.
- B. Flashing: Provide flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
- C. Fasteners:
  1. For fastening fiber cement, use hot-dip galvanized fasteners complying with manufacturer's directions.

- D. Insect Screening for Soffit Vents: PVC-coated, glass-fiber fabric, 18-by-14 or 18-by-16 (1.4-by-1.8- or 1.4-by-1.6-mm) mesh.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding and soffit and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

#### 3.3 INSTALLATION

- A. General: Comply soffit manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
  - 1. Do not install damaged components.
  - 2. Center nails in elongated nailing slots without binding siding to allow for thermal movement.
- B. Install fiber-cement soffit and related accessories.
  - 1. Install fasteners no more than 24 inches o.c. and according to manufacturer's directions and applicable requirements of the authorities having jurisdiction.
- C. Install joint sealants as specified in Division 07 Section "Joint Sealants" and to produce a weathertight installation.

#### 3.4 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074600

## 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:

##### 1. Manufactured Products:

- a. Manufactured reglets and counterflashing.
- b. Manufactured through wall penetration accessory components.
- c. Gutters and Downspouts
- d. Downspout Adapters

##### 2. Formed Products:

- a. Formed roof drainage sheet metal fabrications and fascia wrap.
- b. Formed wall sheet metal fabrications.
- c. Formed equipment support flashing.

##### B. Related Sections:

- 1. Division 07 Section "Roof Specialties" for manufactured roof specialties not part of sheet metal flashing and trim.
- 2. Division 07 Section "Self-Adhering Sheet Waterproofing" for substrate flashings and transitions.
- 3. Division 07 Section "Water Resistive Barrier / Air Barrier" for weather barrier substrate.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated 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. Fabricate and install roof edge flashing capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:

1. As indicated on drawings.
- C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
  1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
  1. Identification of material, thickness, weight, and finish for each item and location in Project.
  2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  4. Details of termination points and assemblies, including fixed points.
  5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
  6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  7. Details of special conditions.
  8. Details of connections to adjoining work.
  9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
  1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
  2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
  3. Accessories and Miscellaneous Materials: Full-size Sample.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified fabricator.
- B. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that 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. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Review of mockups does not constitute acceptance of deviations from the Contract Documents contained in mockups unless Architect specifically accepts such deviations in writing.
  - 2. Accepted mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials and roof accessories.
  - 2. Review methods and procedures related to sheet metal flashing and trim.
  - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  - 4. Review special roof details, roof drainage, roof penetrations and condition of other construction that will affect sheet metal flashing.
  - 5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.



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. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows 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 D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - 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 MANUFACTURERS

- A. Subject to compliance with requirements, provide products manufactured by one of the following, but not limited to:
  - 1. Through-Wall Flashing:
    - a. Advanced Building Products Inc.; Cop-R-Loc Interlocking Flashing.
    - b. Cheney Flashing Company, Inc.
    - c. Dur-O-Wal, Dayton Superior Corporation.
    - d. Keystone Flashing Company, Inc.
    - e. Quickflash Weatherproofing Products.
  - 2. Reglets:
    - a. Cheney Flashing Company, Inc.
    - b. Fry Reglet Corporation.
    - c. Heckmann Building Products Inc.
    - d. Hickman, W. P. Company.
    - e. Keystone Flashing Company, Inc.

## 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
  - 1. Exposed Coil-Coated Finishes:
    - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - 2. Color: As selected by Architect from manufacturer's standard color selections.
    - 3. Concealed and Field Painted Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Through-wall penetrations: Provide preformed or manufactured flashing hood system suitable for attachment to sheathing substrate as recommended by manufacturer and as indicated.
- C. 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 or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

- D. 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 (13 mm) wide and 1/8 inch (3 mm) thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

#### 2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
  - 1. 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.
  - 2. Obtain field measurements for accurate fit before shop fabrication.
  - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
  - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: 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 as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual "for application, but not less than thickness of metal being secured.

- F. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
- G. Do not use graphite pencils to mark metal surfaces.

## 2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers and gutter accessories from same metal as gutters.
  - 1. Gutter Style Residential Buildings: 6" K Style Gutter
  - 2. Gutter Style Clubhouse/Maintenance/Mail Kiosk: See details for sizes and profiles.
  - 3. Expansion Joints: Lap type.
  - 4. Accessories: Valley baffles, vertical wall kick outs on roof
  - 5. Fabricate from the following materials:
    - a. Aluminum: 0.027 inch minimum thick.
- B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
  - 1. Hanger Style: Manufactured strap.
  - 2. Size: 3"x4"
  - 3. Fabricate from the following materials:
    - a. Aluminum: 0.019 inch minimum thick.
  - 4. Downspout Adapters: 3x4x4 PVC Adapters as required to connect to specified site storm lateral piping and aluminum downspouts. Anchor in place to resist force in downspout. Seal anchor penetrations and joints with elastomeric Sealant.

## 2.6 ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch minimum thick.
  - 2. Galvanized Steel: 0.022 inch minimum thick.
- B. Valley Flashing: Fabricate from the following materials:
  - 1. Galvanized Steel: 0.028 inch minimum thick.
  - 2. Aluminum: 0.032 inch minimum thick.
- C. Drip Edges: Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch minimum thick.
- D. Eave and Rake Flashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch minimum thick.
- E. Roof edge Fascia Wrap; Fabricate from the following materials;
  1. Aluminum: 0.032 inch minimum thick.
- F. Counterflashing: Fabricate from the following materials:
  1. Aluminum: 0.032 inch minimum thick.
- G. Flashing Receivers: Fabricate from the following materials:
  1. Aluminum: 0.032 inch minimum thick.
- H. Roof-Penetration Flashing: Fabricate from the following materials:
  1. Stainless Steel: 0.019 inch minimum thick.
  2. Galvanized Steel: 0.028 inch minimum thick.

## 2.7 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill and similar flashings to extend 4 inches minimum beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
  1. Aluminum: 0.032 inch minimum thick.

## 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.
  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.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings and specified in Division 7 "Asphalt Shingles".

### 3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  5. Install sealant tape where indicated.
  6. Torch cutting of sheet metal flashing and trim is not permitted.
  7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
- C. 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 watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes indicated or recommended by manufacturer.
- E. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

### 3.4 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

- B. Hanging Gutters: Join sections with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
  - 1. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
  - 2. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
- C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
  - 1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
  - 2. Provide elbows at base of downspout to direct water away from building.
  - 3. Connect downspouts to underground drainage system if indicated or provide cement splash pans.
- D. Splash Pans: Install where downspouts discharge on roofs. Set in asphalt roofing cement compatible with roof shingles.
- E. Storm Water System Connection: Provide accessory connection piece to fit into PVC storm collection system. Caulk around the connection to prevent water from coming out.

### 3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.
- D. Install roof wall kick out flashing: whether shown in drawings or not, at all locations where a roof fascia terminates adjacent to a vertical wall. This flashing shall divert water away from the wall to fascia intersection.

### 3.6 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill and similar flashings to extend 4 inches beyond wall openings.

### 3.7 ERECTION 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 as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

### 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 solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. 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.

END OF SECTION 076200



## SECTION 076500 – MANUFACTURED FLASHING PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Manufactured flashing panels for through wall penetrations, rough opening protective and corner reinforcing; window and door openings.

#### 1.2 COORDINATION

- A. Coordinate flashing panel type sizes and placement with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate flashing panel installation with adjoining applied finishes and wall materials, joints, and seams to provide leak proof, secure, and noncorrosive installation.

#### 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 manufactured product and accessory.

##### B. Shop Drawings: For flashing panels and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, and 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 supporting, and securing, including layout and spacing of fasteners, and other accessory attachments.
5. Include details of special conditions.
6. Include details of connections to adjoining work.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not store flashing panels and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store flashing panels and trim materials in manufacturer's original labeled, unopened containers and packaging.

## 1.5 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace flashing panels and trim that shows 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 D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to panel.
  - 2. Panel Warranty Period: Ten (10) years from date of Substantial Completion.
  - 3. Labor Warranty Period: One (1) year from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Flashing panel and trim assemblies 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 flashing panel installation shall not leak, or loosen, and shall remain watertight.

### 2.2 FLASHING PANELS

- A. General: Provide flashing panel products and accessories sized to accommodate penetration materials and provide a weatherproof seal at the building envelope.
- B. Flashing Panels
  - 1. Manufacturers: Subject to compliance with requirements, provide the following:
    - a. Quickflash Weatherproofing Products, Inc. (Basis of Design) for through wall penetrations of mechanical, electrical and plumbing components
    - b. W. R. Grace & Co. – “VYCORner” (Basis of Design) prefabricated opening protective corner flashing and reinforcing accessories for doors, windows and large framed openings in the exterior wall envelope.
    - c. Mid-America Components –2 piece Hooded Vents (bath exhaust and dryer exhaust), and mounting blocks for electrical outlets and fixtures, “SturdiMount”, (Basis of Design).

2. Flashing Panels:

- a. Combination of high-density polyethylene (HDPE) and low-density polyethylene (LDPE).
- b. Weatherproof seal: Thermoplastic elastomer.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, tapes, sealants, and other miscellaneous items as required for complete flashing panel and trim installation and as recommended by manufacturer of flashing panel product manufacturer unless otherwise indicated.

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, GENERAL

- A. General: Anchor flashing panels and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners protective coatings, separators, sealants, and other miscellaneous items required to complete flashing panel and trim system.
1. Install flashing panels and trim true to line, levels, and slopes.
  2. Install flashing panels and trim to fit substrates and to result in watertight performance.
- B. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by panel manufacturer to achieve maximum pull-out resistance.
- C. General: Install flashing panels to intercept and exclude penetrating moisture. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

- D. Opening Flashings in Frame Construction: Install continuous corner reinforcing flashing panel components and similar flashings to extend 4 inches beyond edge of framed rough wall openings.

### 3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces of substances that interfere with installation of the work of following trades.
- B. Clean off excess sealants.
- C. Replace flashing panels and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076500

## 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. Roof-edge flashings.
  - 2. Reglets and counterflashings.
- B. Related Sections:
  - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Division 07 Section "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
  - 3. Division 07 Section "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

#### 1.3 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.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Include plans, elevations, keyed details, and attachments to other work.
- C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- D. Samples for Verification: Made from 12-inch lengths of full-size components including fasteners, cover joints, accessories, and attachments.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- B. Warranty: Sample of special warranty.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

## 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 specialties installation.

## 1.8 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which 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 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - 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 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
  - 1. Exposed Coil-Coated Finishes:
    - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Color: As selected by Architect from manufacturer's full range.

## 2.2 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

## 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. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- C. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## 2.4 GENERAL FINISH REQUIREMENTS

- 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 not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of accepted Samples and are assembled or installed to minimize contrast.

## 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. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

### 3.3 INSTALLATION, GENERAL

- A. General: 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, 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 watertight 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 roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Fastener Sizes: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- D. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

### 3.4 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 solder and 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 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. Penetrations in fire-resistance-rated walls.
- 2. Penetrations in horizontal assemblies.
- 3. Penetrations in smoke barriers.

- B. Related Sections:

- 1. Division 07 Section "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified

requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
  - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

## 1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with project requirements and approval by authorities having jurisdiction, provide products by one of the following, but not limited to:
  - 1. A/D Fire Protection Systems Inc.
  - 2. Grace Construction Products.
  - 3. Hilti, Inc.
  - 4. Johns Manville.
  - 5. Nelson Firestop Products.
  - 6. NUCO Inc.
  - 7. Specified Technologies Inc.
  - 8. 3M Fire Protection Products.
  - 9. Tremco, Inc.; Tremco Fire Protection Systems Group.
  - 10. USG Corporation.

## 2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
  - 1. Fire-resistance-rated walls include fire walls, smoke-barrier walls and fire partitions.
  - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
  - 1. Horizontal assemblies include floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
  - 2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
  - 3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
  - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.
- E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Sealants: 150 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- H. 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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:
  - a. Slag-wool-fiber or rock-wool-fiber insulation.
  - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
  - c. Fire-rated form board.
  - d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

### 2.3 FILL MATERIALS

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- G. 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.
- H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

## 2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping 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: Clean out openings immediately before installing penetration firestopping 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.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: 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.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping 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 fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 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. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. 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. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- B. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping 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 is 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 and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413



## SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Joints in or between fire-resistance-rated constructions.
- 2. Joints at exterior wall/floor intersections.
- 3. Joints in smoke barriers.
- 4. Special Inspections for fire-resistive joint systems.

- B. Related Sections:

- 1. Division 07 Section "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.
- D. Quality Assurance Program: Provide a quality assurance program for the installation of fire-resistive joint system assemblies in compliance with Section 12.3.2 of the 2012 Florida Fire Code.

## 1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. **Special Inspections:** The Contractor will provide a quality assurance program and third party inspections of installed fire-resistive joint system assemblies in compliance with Section 12.3.2 of the Florida Fire Prevention Fire Code and acceptable to the permit authorities having jurisdiction for all buildings of three stories or greater in height. The inspections must be done by a design professional engineer and findings reported to the Architect of Record. The inspections will be documented by reports of findings submitted to the Contractor for review and distribution. Reported observed deficiencies will be remedied and re-inspected.

## 1.6 PROJECT CONDITIONS

- A. **Environmental Limitations:** Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. **Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.**

## 1.7 COORDINATION

- A. **Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.**
- B. **Coordinate sizing of joints to accommodate fire-resistive joint systems.**

## PART 2 - PRODUCTS

### 2.1 FIRE-RESISTIVE JOINT SYSTEMS

- A. **Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint 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 fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:**

1. Joints include those installed in or between fire-resistance-rated walls and floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
  2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
- C. Manufacturers: Subject to compliance with project requirements and approval of the authorities having jurisdiction, provide products by one of the following, but not limited to:
- a. A/D Fire Protection Systems Inc.
  - b. CEMCO.
  - c. Grace Construction Products.
  - d. Hilti, Inc.
  - e. Johns Manville.
  - f. 3M Fire Protection Products.
  - g. Tremco, Inc.; Tremco Fire Protection Systems Group.
  - h. USG Corporation.
- D. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. VOC Content: Fire-resistive joint system sealants shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Architectural Sealants: 50 g/L.
  2. Sealant Primers for Nonporous Substrates: 250 g/L.
  3. Sealant Primers for Porous Substrates: 775 g/L.
- F. Low-Emitting Materials: Fire-resistive joint system sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- G. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems 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: Clean joints immediately before installing fire-resistive joint systems 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 fill materials.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint 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.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

### 3.3 INSTALLATION

- A. General: Install fire-resistive joint 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 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 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 fill materials for fire-resistive joint systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
  - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
  - 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 FIELD QUALITY CONTROL

- A. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.

- B. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements.

### 3.5 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint 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 fire-resistive joint 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 fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION 078446

## SECTION 079200 - JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Latex joint sealants.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

- C. Samples: For each kind and color of joint sealant required.

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. Product test reports.

- B. Preconstruction laboratory test reports.

- C. Preconstruction field-adhesion-test reports.

- D. Field-adhesion-test reports.
- E. Sample warranties.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

#### 1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

#### 1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 JOINT SEALANTS, GENERAL

- A. VOC Content: Sealants and sealant primers shall comply with the following:
  - 1. Architectural sealants shall have a VOC content of 250 g/L or less.
  - 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
  - 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
- B. Colors of Exposed Joint Sealants (unpainted): As selected by Architect from manufacturer's standard color selections.

## 2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, 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, but are not limited to the following:
- a. Dow Corning Corporation.
  - b. GE Construction Sealants; Momentive Performance Materials Inc.
  - c. Pecora Corporation.
  - d. Sika Corporation; Joint Sealants.

## 2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, 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, but are not limited to the following:
- a. Dow Corning Corporation.
  - b. GE Construction Sealants; Momentive Performance Materials Inc.
  - c. Pecora Corporation.
  - d. Sika Corporation; Joint Sealants.
  - e. Tremco Incorporated.

## 2.4 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
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. BASF Corp. - Construction Chemicals.
  - b. Pecora Corporation.
  - c. Sherwin-Williams Company (The).



d. Sika Corporation; Joint Sealants.

- B. 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 C 920, Type M, Grade P, Class 50, Uses T and NT.

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. LymTal International Inc.

2.5 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, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

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. Dow Corning Corporation.

b. GE Construction Sealants; Momentive Performance Materials Inc.

c. Pecora Corporation.

d. Tremco Incorporated.

- C. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

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. Pecora Corporation.

b. Sherwin-Williams Company (The).

c. Tremco Incorporated.

2.6 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C closed-cell material with a surface skin or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

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. BASF Corp. - Construction Chemicals.
- b. Construction Foam Products; a division of Nomaco, Inc.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

## 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.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 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 laitance and form-release agents from concrete.
- 2. 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.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

### 3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. 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.

- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. 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.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

### 3.3 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 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
  - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- 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.

### 3.4 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
  - 1. Joint Locations:
    - a. Control and expansion joints in brick pavers.
    - b. Isolation and contraction joints in cast-in-place concrete slabs.
    - c. Joints between plant-precast architectural concrete paving units.
    - d. Joints in stone paving units, including steps.
    - e. Tile control and expansion joints.

- f. Joints between different materials listed above.
    - g. Other joints as indicated on Drawings.
  2. Joint Sealant: Urethane, M, P, 50, T.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Joints between plant-precast architectural concrete units.
    - c. Control and expansion joints in unit masonry.
    - d. Joints in dimension stone cladding.
    - e. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
  1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in stone flooring.
    - c. Control and expansion joints in brick flooring.
    - d. Control and expansion joints in tile flooring.
    - e. Other joints as indicated on Drawings.
  2. Joint Sealant: Urethane, S, P, 25, T.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
  1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Tile control and expansion joints.
    - c. Vertical joints on exposed surfaces of unit masonry, walls and partitions.
    - d. Other joints as indicated on Drawings.
  2. Joint Sealant: Urethane, S, NS, 25, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors, if not painted.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement..
  1. Joint Locations:

- a. Control joints on exposed interior surfaces of exterior walls.
  - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
  - c. Other joints as indicated on Drawings.
2. Joint Sealant: Acrylic latex.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors if not painted.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces (in damp locations such as janitor rooms and bathrooms).
1. Joint Locations:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range standard colors.
- G. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
    - a. Aluminum thresholds.
    - b. Sill plates.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: Butyl-rubber based.

END OF SECTION 079200

## 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.
- B. As Applicable, exterior door frames and blanks must be as approved by evidence of a current Florida Product Approval.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Standard hollow metal doors and frames.
- B. Related Sections:
  - 1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
  - 2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
  - 3. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames

#### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.
- C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

#### 1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Wind Loads – see structural plans
- B. Design Requirements – see structural plans
- C. Structural Performance – see structural plans

## 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 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 anchorages, joints, field splices, and connections.
  - 7. Details of accessories.
  - 8. Details of moldings, removable stops, and glazing.
- C. Other Action Submittals:
  - 1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.
- E. System Performance: System certifications and approvals acceptable to Authority having Jurisdiction

## 1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.
- D. Preinstallation Conference: Conduct conference at Project site.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, 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 finish of 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 work under cover at Project site. Do not store in a manner that traps excess humidity or places excessive concentrated load on products.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

## 1.9 COORDINATION

- A. Coordinate installation of anchorages 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.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements and Florida Product Approvals, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Ceco Door / Assa Abloy (Basis of Design)
  - 2. Jeld-Wen
  - 3. Vision Hollow Metal Limited.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum A40 (ZF120) metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.



1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008 or ASTM A 1011/A, hot-dip galvanized according to ASTM A 153, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.
- F. Powder-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.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Division 08 Section "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
  1. Design: flush panel
  2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
    - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
  3. Vertical Edges for Single-Acting Doors: Manufacturer's standard.
    - a. Beveled Edge: 1/8 inch in 2 inches
  4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
  5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch-thick, end closures or channels of same material as face sheets.
  6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated and by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 1 and Physical Performance Level C (Standard Duty), Model 1 (Full Flush).
  - a. Width: 1-3/4 inches.
  - b. Provide Insulated Doors at Conditioned Spaces.
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated and referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  1. Level 1 and Physical Performance Level C (Standard Duty), Model 1 (Full Flush).
    - a. Width: 1-3/4 inches.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

#### 2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
  1. Fabricate frames with mitered or coped corners.
  2. Fabricate frames as full profile welded unless otherwise indicated.
  3. Frames for Level 1 Steel Doors: 0.042-inch- thick steel sheet minimum.
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
  1. Fabricate frames with mitered or coped corners.
  2. Fabricate frames as full profile welded for masonry assemblies.
  3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
  4. Frames for Level 1 Steel Doors: 0.042-inch- thick steel sheet.
  5. Frames for Wood Doors: 0.042-inch- thick steel sheet.
  6. Frames for Borrowed Lights: 0.042-inch- thick steel sheet.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

#### 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  1. Masonry Type for Interior Walls: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Masonry Type for Exterior Walls: See Florida Product approval for requirements.
  3. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
  4. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  5. Post-installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

## 2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

## 2.7 LOUVERS

- A. Provide louvers for interior doors, where indicated, that comply with SDI 111C, 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-shaped or Y-shaped blades.
  2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other, any angle.
  3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed, labeled and tested for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing and inspecting agency that established fire-resistance rating of door assembly.

## 2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch-wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

## 2.9 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  2. Glazed Lites: Factory cut openings in doors.
  3. 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.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  2. Sidelight and Transom Bar 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 butt welding.
  3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  6. Jamb Anchors: Provide number and spacing of anchors as follows and as required by Florida Product Approvals for exterior doors:
    - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.

- 3) Five anchors per jamb from 90 to 96 inches high.
  - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
  - 5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
- c. Compression Type: Not less than two anchors in each jamb.
  - d. Post-installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
7. Door Silencers: Except on weather-stripped doors, 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.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8 .
  2. Reinforce doors and frames to receive non-templated, mortised and surface-mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 16 Sections.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  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.
  4. Provide loose stops and moldings on inside of hollow metal work.
  5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.10 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Field Finish: See Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

### 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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing unsatisfactory conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
  1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. 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, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on secure side of opening.
    - d. Install door silencers in frames before grouting if indicated.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that are filled with grout .
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and accepted on Shop Drawings.
  - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
  - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  - 5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
  - 6. 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. Prime entire patch area.
  - 7. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  - 8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
  - 9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb 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 hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops 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.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before turn-over to owner. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. 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.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113



## SECTION 081115 - HOLLOW METAL DOORS AND WOOD 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. Standard insulated and non-insulated hollow metal doors and wood frames.

- B. Related Sections:

- 1. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
  - 2. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

#### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.
- C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 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 anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.

C. Samples for Verification:

1. For the following items, prepared on Samples about 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
  - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
  - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.

D. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and wood frame assembly.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252. Provide minimum 20-min. rating or as indicated.
- C. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  1. Provide additional protection to prevent damage to finish of factory-finished units.
- B. Deliver prefabricated wood frames with two removable spreader bars and protection spacers. Casing shall be supplied separately and may be factory prepared for field installation as indicated.

- C. Store hollow metal doors, wood frames, stops and casing components under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Coordinate and verify actual dimensions of openings by field measurements before fabrication.

## 1.9 COORDINATION

- A. Coordinate installation of anchorages for wood frames. Furnish setting drawings, templates, and directions for installing anchorages. Deliver all items to Project site in time for installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements and Florida Product Approvals, available Manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
  - 1. Ceco Door Products; and Assa Abloy Group Company.
  - 2. Amweld Building Products, LLC.
  - 3. Benchmark; a division of Therma-Tru Corporation.
  - 4. Curries Company; an Assa Abloy Group company.
  - 5. Fleming Door Products Ltd.; an Assa Abloy Group company.
  - 6. Masonite International, Corp.
  - 7. Steelcraft; an Ingersoll-Rand company.
  - 8. Vision Hollow Metal Limited
  - 9. Jeld-Wen

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications, minimum 18 ga., or as indicated.
  - 1. Frame Anchors: As indicated.
- B. Glazing: Comply with requirements in Division 08 Section "Glazing" for interior doors. Provide manufacturer's standard tempered insulating low E clear glass units for exterior doors.
- C. Wood Jambs: As indicated.

## 2.3 STANDARD HOLLOW METAL DOORS AND WOOD FRAMES

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8. Comply with Manufacturer requirements and with details indicated for type and profile.
1. Design: As indicated.
  2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
    - a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than R-13 when tested according to ASTM C 1363.
      - 1) Locations: Exterior doors.
  3. Vertical Edges for Single-Acting Doors: Manufacturer's standard.
  4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
  5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Interior and Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 1 and Physical Performance Level C (Standard Duty), [Model 1 (Full Flush)]
    - a. As indicated on Drawings.
- C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- D. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- E. Moldings for Glazed Lites in Doors: Fabricated from same material as door face sheet in which they are installed.
- F. Loose Stops for Glazed Lites in Frames: Fabricated from same material as frames in which they are installed.

## 2.4 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

- B. Tolerances: Fabricate hollow metal work to tolerances indicated.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  - 2. Glazed Lites: Factory cut openings in doors, factory glaze with clear, tempered, Low 'E', insulating units with Argon gas fill.
  - 3. 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.
- D. Wood Frames: Where frames are fabricated in sections due to shipping, handling or field conditions, provide and maintain alignment at each joint.
  - 1. Provide countersunk, flat-head exposed screws for exposed fasteners unless otherwise indicated.
  - 2. Jamb Anchors: Locate anchors as indicated by manufacturer.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
  - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
- G. Stops and Moldings: Provide stops and moldings where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  - 1. Provide loose casing moldings on inside and outside of doors and frames.
  - 2. Provide loose stops and moldings on inside of work.
  - 3. Coordinate rabbet width between fixed and removable stops with type of installation indicated.

## 2.5 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer

manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 2.6 WOOD FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and preparation.
  - 1. Primer: Manufacturer's standard recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 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. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install hollow metal and wood frame work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Wood Frames: Install wood frames of size and profile indicated.
  - 1. Set wood frames accurately in position, shimmed, plumbed and aligned securely until permanent anchors are set.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Install frames with removable glazing stops located on secure side of opening.
    - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  - 2. Installation Tolerances: Adjust wood frames for squareness, alignment, twist, and plumb to the following minimum 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.
  3. Fire-Rated Doors: Install door frames with clearances according to NFPA 80.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
  1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
  1. Secure stops with countersunk flat-head wood screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner and as indicated.

### 3.3 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081115

## SECTION 081315 – ALUMINUM-FRAMED SCREEN ENCLOSURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes aluminum framed screen enclosures with integral guard rails for exterior porches and patios.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of aluminum frame member.
- B. Shop Drawings: For aluminum framed enclosures with integral guard rail assemblies.
- C. Samples: For aluminum frame color selection. Provide manufacturer's full color range.
- D. Delegated-Design Submittal: For aluminum framed enclosures with integral guard rail assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Design attachments of frame to attach only to the mounting brackets embedded in the slab, see Architectural details.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
- B. Delegated Design: Design frame enclosures, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated. Design attachments of frame to attach only to the mounting brackets embedded in the slab, see Architectural details. Show all attachments to building construction noted all conditions and provide engineering for the attachments. Show waterproofing of the attachments where attached into frame construction.
- C. General: In engineering frame enclosures to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  - 1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- D. Structural Performance: Integral guard rail assemblies shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated as minimum requirements or as required by authorities having jurisdiction. The more stringent requirements apply.



1. Top Rails of Guards:
  - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
  - b. Concentrated load of 200 lbf (0.89 kN) 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 (0.22 kN) applied horizontally on an area of 1 sq. ft..
  - b. Infill load and other loads need not be assumed to act concurrently.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification data for fabricator and installer.
- B. Sample warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum frame components that meet or exceed performance requirements required and of documenting this performance by inclusion delegated design engineered submittal materials.

#### 1.7 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of aluminum enclosure frames that fail in materials or workmanship within specified warranty period.
  1. Warranty Period:
    - a. Aluminum Finish: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 ALUMINUM FRAMED SCREEN ENCLOSURES

#### 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.

## 2.3 ALUMINUM

- 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 B 221 (ASTM B 221M), Alloy 6063-T5/T52.
- C. Drawn Seamless Tubing: ASTM B 210 (ASTM B 210M), Alloy 6063-T832.
- D. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), Alloy 6061-T6.
- F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

## 2.4 FASTENERS

- A. General: Provide the following:
  - 1. Aluminum Railings, incl. second level attachments to balcony support embeds: Type 304 stainless-steel fasteners.
- 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 indicated 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.
  - 2. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors at ground level slabs: 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 E 488, conducted by a qualified independent testing agency.
  - 1. Material for Exterior Locations and where stainless steel is indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

## 2.5 MISCELLANEOUS MATERIALS

- A. Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.6 INSECT SCREENS

- A. Glass-Fiber Mesh Fabric: 18-by-14 (1.1-by-1.4-mm) or 18-by-16 (1.0-by-1.1-mm)] 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, in the following color. Comply with ASTM D 3656.
  - 1. Mesh Color: Charcoal gray.

## 2.7 ACCESSORIES

- A. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for aluminum terrace doors, complying with ASTM B 456 or ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

## 2.8 FABRICATION

- A. Fabricate aluminum enclosure frames in sizes indicated on accepted shop drawings. Include a complete system for assembling components and anchoring frames.
- B. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.
- C. Provide hard neoprene spacers to support bottom rail to allow water passage off balcony.

## 2.9 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  - 1. Color and Gloss: As selected by from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing frames, screen panels, and other components.
- B. Install aluminum frame enclosures level, plumb, square, true to line; without distortion, warp, or rack of frames and panels and without impeding thermal movement; anchored securely in place to structural support; and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.
- C. Install aluminum frames and components to drain condensation, water-penetrating joints, and moisture migrating within frames to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

END OF SECTION 081315

## SECTION 081416 – INTERIOR WOOD AND METAL BI-FOLD/CLOSET DOORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Hollow-core door blanks with MOLDED hardboard, paneled faces.
2. Interior wood door frames; finger joint pine, split jambs
3. Shop priming hardboard wood doors.
4. Factory fitting interior doors to frames and factory machining for hardware
5. Bi-fold track and hardware
6. Metal Embossed Louvered Bi-Fold Doors
7. Metal Vented Furnace and Water Heater Doors

#### 1.2 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
1. Indicate dimensions and locations of reinforcing and holes for hardware.
  2. Indicate dimensions and locations of cutouts.
  3. Doors to be factory primed.
- C. Warranty: Sample of manufacturer's warranty.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain interior wood doors from single manufacturer.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period. Failures

include doors that have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers Panel Wood Doors: 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. Craftmaster Doors
  2. Jeld - Wen, Inc.
  3. Masonite, Inc. (Basis of Design, Heritage Series Lincoln Park Door)
- B. Manufacturer Bi-Fold Metal Embossed Louvered Doors, 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. Slimfold-Louver II
- C. Manufacturer Metal Furnace and Water Heater Doors, 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. Slimfold- Furnace and Water Heater Door
  2. Model 500-See Plans for size.

### 2.2 DOOR CONSTRUCTION, GENERAL

- A. Hollow-Core Doors:
  1. Construction: Standard hollow core.
- B. Metal Louvered Bi-Fold Doors
  1. Cold Rolled Steel White Electrostatically applied baked on enamel finish
  2. Finish: Textured
  3. Color: White
- C. Metal Vented Furnace and Water Heater Doors
  1. Cold Rolled Steel White Electrostatically applied baked on enamel finish
  2. Finish: Textured
  3. Color: White

## 2.3 WOOD DOORS FOR OPAQUE FINISH

### A. Interior Hollow-Core Doors

1. Grade: Standard
2. Faces: Hardboard or MDF.
  - a. Hardboard Faces: AHA A135.4, Class 2 (standard).
  - b. MDF Faces: ANSI A208.2, Grade 150 or 160.
3. Exposed Vertical and Top Edges: Any closed-grain hardwood.
4. Construction: Manufacturer's standard.
5. 1 panel design

## 2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.

## 2.5 SHOP PRIMING

- A. Wood doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 099123 "Interior Painting".

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or schedule, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.2 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 08221 - FIBERGLASS DOORS AND FRAMES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Fiberglass doors, non-rated and rated.
- B. Fiberglass Door Frames.

#### 1.2 RELATED SECTIONS

- A. Section 08710 - Door Hardware: Surface-mounted hardware.

#### 1.3 REFERENCES

- A. ASTM E 90 - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- B. ANSI/WDMA I.S.1A - Quality Standards of the Window and Door Manufacturers Association for Architectural Flush Wood Doors.
- C. ANSI A 151.1 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.
- D. WDMA I.S 6A - Architectural Wood Style and Rail Doors.
- E. NWWDA T.M. 9 - Test procedure for factory applied finished paint.
- F. ASTM D 3359 - Test Method for Measuring Adhesion by Tape Test.
- G. ASTM D 4060 - Test Method for Abrasion Resistance of Organic Coatings by Tabor Abrader.
- H. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings; Chemical resistance.
- I. NWWDA T.M. 7 - Cycle Slam Test Method.
- J. WDMA I.S. 1A - Architectural Wood Flush Doors; Thermal bow / manufacturing tolerances.
- K. ASM C 236 - Test Method for Steady-State Thermal Performance of Building

Assemblies by Means of Garfield Hot Box; Thermal Performance (U-Value).

#### 1.4 DESIGN REQUIREMENTS

- A. General: Provide exterior door assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.
- B. Wind Loads: Provide exterior doors and frames, including anchorage, capable of withstanding impact loads and wind-load design pressures calculated according to requirements of the American Society of Civil Engineers' ASCE 7-98, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure."
- C. Performance Requirements:
  - 1. Doors:
    - a. Standard door to meet requirements of ANSI A 250.4 procedure for level C doors for 250,000 cycles
    - b. Thermal resistance of door without lite or louver U-factor of .17, with lite U-Factor of .30. Shading Coefficient SHGC of <.25.

#### 1.5 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance instructions for sealing door edges.
- B. Shop Drawings: Indicate the following:
  - 1. Door schedule; include elevations, sizes, handing.
  - 2. Locations and sizes of lites and louvers, if indicated.
  - 3. Hardware preparation.
- C. Selection Samples: For factory finished doors, submit two complete sets of manufacturer's full range of available colors and finishes. Samples shall represent the color selected on fiberglass typical of grain patterns and coloration for the specified door.
- D. Certificates: Manufacturer certification that doors and materials comply with specified performance and physical properties signed by an authorized company

representative.

- E. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- F. Closeout: Submit warranty documents specified herein.

## 1.6 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Member of Wood Door Manufacturer's Association (WDMA)
  - 2. Installer: Minimum three years documented experience installing products specified in this section

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive products in manufacturer's unopened, undamaged packaging with manufacturer's labels intact.
- B. Storage and Protection: Store in an enclosed location protected from exposure to harmful weather conditions and at temperature and relative humidity conditions as recommended by manufacturer.
  - 1. Store doors flat on a level surface, supported to prevent warpage, in a clean, dry and well-ventilated area protected from sunlight.
  - 2. Do not subject doors to extreme heat, dryness or moisture.
  - 3. Break seal (plastic protective packaging only) onsite to permit ventilation, if required.
  - 4. Seal door edges immediately upon delivery, prior to storage.
  - 5. Do not drag doors across one another.

## 1.8 PROJECT CONDITIONS

- A. Maintain required temperature and relative humidity in spaces where products will be installed for a minimum of 24 hours before, and during and after installation as recommended by manufacturer.
- B. Relative humidity shall be 10 to 90 percent; temperature shall be 20 to 110 degrees F (-6 to 43 degrees C).
- C. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.9 WARRANTY

- A. Provide manufacturer's warranty of its products against the following:
  - 1. Manufacturing defects, which may, in any way, impair or affect performance of the door for the purpose, which it is intended. Replacement under this warranty shall include reasonable cost of hanging, installation of hardware, and finishing.
  - 2. Warp or twist of 1/4 inch (6 mm) or more in any 3 foot 6 inch (1.10 m) by 7 foot (2.13 m) section of a door.
  - 3. Telegraphing of any part of core assembly through face to cause surface variation of 1/100 inch (2.54 mm) or more in a 3 inch (76 mm) span.
  - 4. Delamination to any degree.
  
- B. Warranty Period: Exterior door: Limited Lifetime.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Acceptable Manufacturer: Benchmark HMF Commercial Door Systems, Division of Therma-Tru Corporation; 3000 Mine Road, Fredericksburg, VA 22408. ASD. Tel: (540) 898-5700, Fax: (540) 898-5802.
  - 2. Style: Smooth-Star, single panel door
  
- B. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

### 2.2 FIBERGLASS DOORS

- A. Door Construction General: Panels shall be laminated, using a high-performance adhesive to thermally broken, trimmable stiles and rails forming a perimeter to reduce thermal transmission and allow for field preparation of hardware. The bottom edge shall be manufactured from a moisture-resistant and decay-resistant composite.
  
- B. Fiberglass Doors:
  - 1. Therma-Tru Smooth Star Style: 1 Panel Shaker, 20 minute Rated, Smooth, Style No SSF1100: fiberglass-reinforced thermoset composite compound.
    - a. See Drawings for Panel and Glazing Style.
    - b. Thickness: 1-3/4 inches.
    - c. Sizes: Indicated on drawings.

- d. Fire Rating: 20 Minutes where indicated

## 2.3 FIBERGLASS FRAMES

- A. Non-rated Fiberglass Frames at non-rated doors.
  - 1. Construction: One-piece pultruded fiberglass reinforced plastic, minimum 1/4 inch wall thickness, jamb-to-head joints mitered and reinforced with FRP clips and stainless steel fasteners; conforming to SDI requirements for performance equivalent to 16 gage steel frames.
  - 2. Sizes: Indicated on drawings.
  - 3. Factory Finish: As selected by the owner, with true and consistent color throughout frame thickness.

## 2.4 FABRICATION

- A. Coordinate with hardware manufacturers to assure that doors are properly prepared to receive hinges and hardware. Provide door manufacturer with two copies of hardware schedule, and all necessary hardware templates.
- B. Fabricate non-rated doors in accordance with ANSI/WDMA (formerly NWWDA) IS-1-A requirements including manufacturers enhanced amendments.

## 2.5 FACTORY FINISHING

- A. Prefinishing: Finish shall be in accordance with WDMA T.M. 9-88. Paint to be selected from manufacturers standard colors. Top and bottom of the doors to be sealed. Doors to be individually enclosed in a cardboard box.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

### 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 fiberglass doors and frames in accordance with manufacturer's instructions.
  - 1. Install hardware according to approved hardware schedule for proper locations.
  - 2. Install with full-threaded wood screws furnished by hardware manufacturer.
  - 3. Drill proper size pilot hole for all screws. Full mortise hinges require 5/32 inch (4 mm) pilot holes.
  - 4. Securely anchor hardware in correct position and alignment.
  - 5. Adjust hardware and door for proper function and smooth operation, proper latching, without force or excessive clearance.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### 3.5 SCHEDULES

- A. Schedules: Refer to Door Schedule indicated on the drawings.

END OF SECTION

## SECTION 083113 - ACCESS DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

1. Access doors and frames for ceilings.
2. Wall, partition & ceiling panels for access to plumbing valves.
3. Attic Draftstop Doors.

- B. Related Requirements:

1. Division 09 Section "Interior Painting" for field finishing access doors and frames.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

- B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

- C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the

following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 288 for fire-rated access door assemblies installed horizontally.
2. NFPA 80, provide spring loaded access doors to auto shut doors.

## 2.2 ACCESS DOORS AND FRAMES FOR WALLS, ATTIC ACCESS AND CEILINGS

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. Acudor Products, Inc.
2. Babcock-Davis.
3. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
4. Jensen Industries; Div. of Broan-Nutone, LLC.
5. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
6. Karp Associates, Inc.
7. Larsen's Manufacturing Company.
8. Milcor Inc.

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

C. Fire-Rated, Flush Access Doors with Concealed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.
2. Locations: Ceiling and Rated Walls.
3. Fire-Resistance Rating: Not less than that of adjacent construction.
  1. Temperature-Rise Rating: 450 deg F at the end of 30 minutes.
  2. Metallic-Coated Steel Sheet for Door: Nominal 0.040 inch, 20 gage.
    - a. Finish: Factory prime.
3. Frame Material: Same material, thickness, and finish as door.
4. Hinges: Manufacturer's standard.
5. Hardware: Latch and Lock.
6. Attic access size: minimum 22"x30"

D. Attic Draftstop Doors:

1. Assembly Description: Non Rated access door to provide access through draftstop spaces in the attic while preventing backdraft from one section of the attic to another. Provide self closing and self latching door that allows access from both sides of the door.
2. Locations: Mounted to job built frame to attic truss sheathed with 7/16" OSB.
3. Metallic-Coated Steel Sheet for Door: 14 gage, self closing.
  - a. Finish: Factory powder coated finish
4. Frame Material: 16 gage, Steel.
5. Hinges: Manufacturer's standard.
6. Hardware: Latch and Lock.



7. Attic Draftstop Access size: Minimum 36"x36".

## 2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 metallic coating.
- C. Frame Anchors: Same type as door face.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

## 2.4 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 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 board securely attached to perimeter of frames.
  2. Provide mounting holes in frames for attachment of units to wood framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
  1. For cylinder locks, furnish two keys per lock and key all locks alike to Owner's key schedule..

## 2.5 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. Steel and Metallic-Coated-Steel Finishes for wall and ceiling access doors:
  - 1. Factory Prime: Apply manufacturer's standard, fast-curing, 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.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

#### 3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

## SECTION 083213 - SLIDING ALUMINUM-FRAMED GLASS DOORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes sliding aluminum-framed glass doors for exterior locations.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For sliding aluminum-framed glass doors.
- C. Samples: For each exposed product and for each color specified, 12-inch-long section with weather stripping, glazing bead, and factory-applied color finish.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Qualification data.
- B. Product test reports.
- C. Sample warranty.
- D. Florida Product Approval

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating sliding aluminum-framed glass doors that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

#### 1.6 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of sliding aluminum-framed glass doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period:
  - a. Sliding Door: 10 years from date of Substantial Completion.
  - b. Insulating-Glass Units: 10 years from date of Substantial Completion.
  - c. Laminated Glass: 10 years from date of Substantial Completion.
  - d. Aluminum Finish: 20 years from date of Substantial Completion.

## 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, but are not limited to the following:
  1. MI Windows and Doors (Basis of Design).

### 2.2 PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
  1. Product Certification: AAMA certified with label attached to each door.
- B. Performance:
  1. Design Pressure: +/- 30 psf
  2. Water Penetration Resistance: 9 psf
- C. Thermal Transmittance: NFRC 100 maximum total fenestration product U-factor of 0.55 Btu/sq. ft. x h x deg F for three panel sliding doors and 0.62 Btu/sq. ft. x h x deg F for 4 panel sliding doors.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum total fenestration product SHGC of 0.26.

### 2.3 SLIDING ALUMINUM-FRAMED GLASS DOORS

- A. Threshold and Sill Cap/Track: Provide extruded-aluminum threshold and track of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior; with manufacturer's standard finish.
  1. Low-Profile Floor Track: ADA-ABA compliant.

### 2.4 GLAZING

- A. Glass and Glazing: Manufacturer's standard glazing system that produces weathertight seal. Comply with requirements indicated in Section 088000 "Glazing."

1. Glass: ASTM C1036, Type 1, q3, Category II safety glass complying with testing requirements in 16 CFR 1201.
2. Safety Glazing Labeling: Permanently mark safety glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
3. Insulating-Glass Units: ASTM E2190, certified through IGCC as complying with requirements of IGCC.
  - a. Filling: Fill space between glass lites with air.
  - b. Low-E coating.

## 2.5 HARDWARE

- A. General: Provide manufacturer's standard hardware, fabricated from a corrosion-resistant material compatible with aluminum complying with AAMA 907 and designed to smoothly operate, tightly close, and securely lock sliding aluminum-framed glass doors.
- B. Lock: Install manufacturer's keyed cylinder lock and locking device on each movable panel, lockable from the inside only. Adjust locking device to allow unobstructed movement of the panel across adjacent panel in the direction indicated.

## 2.6 ACCESSORIES

- A. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for sliding aluminum-framed glass doors, complying with ASTM B456 or ASTM B633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- B. Provide with Optional Nailing fin for water proofing installation similar to a fin window (see Architect details).

## 2.7 FABRICATION

- A. Fabricate sliding aluminum-framed glass doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
- B. Weather Stripping: Provide full-perimeter weather stripping for each door panel.
- C. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.
- D. Factory-Glazed Fabrication: Glaze sliding aluminum-framed glass doors in the factory where practical and possible for applications indicated. Comply with requirements in Section 088000 "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440.

2.8 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
  - 1. Color: Dark bronze.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, hardware, accessories, and other components.
- B. Install sliding aluminum-framed glass doors level, plumb, square, true to line, without distortion, without warp or rack of frames and panels, and without impeding thermal movement; anchored securely in place to structural support; and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.
- C. Set sill members in metal pan in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Install sliding aluminum-framed glass doors and components to drain condensation, water penetrating joints, and moisture migrating within doors to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- F. Adjust operating panels to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and a weathertight closure. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.

END OF SECTION 083213

## SECTION 083613 - SECTIONAL DOORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes Residential Metal Overhead Sectional doors.

#### 1.2 SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Delegated-Design Submittal: For sectional doors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of installation anchors. Brackets and accessories.
  - 2. Summary of forces and loads on walls and jambs.
  - 3. Analysis and supporting data indicating compliance of project specific door assemblies with regulatory criteria for testing and acceptance as required by the authorities having jurisdiction.
- D. Qualification Data: For qualified installer and delegated design engineer.
- E. Warranties: Sample of special warranties.
- F. Maintenance Data: For sectional doors to include in maintenance manuals.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain sectional doors from single source from single manufacturer. Obtain operators and controls from sectional door manufacturer.
- 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.

- D. Standard for Sectional Doors: Fabricate sectional doors to comply with DASMA 102 unless otherwise indicated.
- E. Regulatory Requirements: Comply with U.S. Dept of Justice's "2010 ADA Standards for Design, Accessibility Guidelines for Buildings and Facilities (ADAAG)" and ICC/ANSI A117.1.

#### 1.4 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Three years from date of Substantial Completion.
- B. Special Finish Warranty: If other than primed and field painted, manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
  - 1. Design Wind Load: As indicated on Drawings.
  - 2. Testing: According to ASTM E 330.

#### 2.2 DOOR ASSEMBLY – Garage Door at Maintenance Building.

- A. Steel Sectional Door: Sectional door formed with hinged sections.
  - 1. Subject to compliance with requirements, provide the Basis of Design product or comparable product by one of the following:
    - a. Overhead Door Corporation. Basis of Design, Series 5745 Flush Sectional Insulated Steel Door.
    - b. Clopay Building Products; a Griffon company
    - c. Fimbel Architectural Door Specialties.
    - d. General American Door Company.
    - e. Raynor.



- f. Wayne-Dalton Corp.
- B. Operation Cycles: Not less than 10,000.
- C. Thermal Resistance: Minimum  $U=0.60/R-1.67$ .
- D. Steel Sections: Zinc-coated (galvanized) steel sheet with G60 (Z180) zinc coating.
  - 1. Section Thickness: 2 inches.
  - 2. Exterior-Face, Steel Sheet Thickness: Zinc-coated (galvanized) steel sheet of manufacturer's recommended thickness to meet performance requirements.
    - a. Surface: Selected from Manufacturers Standard surface finishes.
    - b. Panels: Provide insulated panels.
- E. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.
- F. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.
- G. Provide reinforcement for hardware attachment.
- H. Track Configuration: Standard-lift.
- I. Weatherseals: Fitted to bottom and top and around entire perimeter of door.
- J. Roller-Tire Material: Manufacturer's standard.
- K. Locking Devices: Equip door with manufacturer's standard locking device assembly.
- L. Counterbalance Type: Torsion spring.
- M. Electric Door Operator:
  - 1. Usage Classification: Light duty, up to 10 cycles per hour.
  - 2. Operator Type: Trolley.
  - 3. Motor Exposure: Interior, clean, and dry.
  - 4. Emergency Manual Operation: Push-up type.
  - 5. Obstruction-Detection Device: Manufacturer's standard automatic photoelectric sensor or electric sensor edge on bottom bar.
  - 6. Belt drive Trolley.
- N. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.
- O. Portable, Control System: Consisting of two portable control device to open and stop door may be momentary-contact type; control to close door shall be sustained – or constant-pressure type.
- P. Door Finish:

1. Factory Prime Finish: Manufacturer's standard color.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks: Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install automatic garage doors openers according to UL 325.
- E. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- F. Touch-up Painting: Immediately after installation, clean abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780.

END OF SECTION 083613

## 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.
- B. All work under this section must comply with and be registered under the Florida Product Approval, herein referred to as Code. Particular attention should be given to the Wind Zone requirements of the FBC for the location in which the Project is located, Orange County, FL.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Exterior storefront framing.
  - 2. Interior storefront framing
  - 3. Exterior manual-swing entrance doors and door-frame units.

#### 1.3 DEFINITIONS

- A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
  - 1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
  - 2. Dimensional tolerances of building frame and other adjacent construction.
  - 3. Failure includes the following:
    - a. Deflection exceeding specified limits.
    - b. Thermal stresses transferring to building structure.
    - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
    - d. Glazing-to-glazing contact.
    - e. Noise or vibration created by wind and by thermal and structural movements.
    - f. Loosening or weakening of fasteners, attachments, and other components.

- g. Sealant failure.
  - h. Failure of operating units.
- B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Florida, using performance requirements and design criteria indicated.
- C. Structural Loads: See Structural Drawings for Design loading.
- D. Design wind loads applicable to Project as indicated in Structural Drawings. Deflection of Framing Members:
  - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans 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 or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
  - 2. 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 directly below them to less than 1/8 inch and clearance between members and operable units directly below them to less than 1/16 inch.
- E. Design Loading Interior Walls: minimum 5 psf over entire storefront system.
- F. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.
- G. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.
- H. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.
- I. Water Penetration under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.
  - 1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other

than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.

- J. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation 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. Test Performance: 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.
  3. Interior Ambient-Air Temperature: 75 deg F.
- K. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 44 when tested according to AAMA 1503.
- L. Thermal Performance Exterior System: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.5 Btu/sq. ft. x h x deg F when tested according to AAMA 1503 and a SHGC of .25, inclusive of the effects of the metal frames.
- M. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
  2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.
- N. Structural-Sealant Joints: Designed to produce tensile or shear stress of less than 20 psi.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
  2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Other Action Submittals:
1. Entrance Door Hardware Schedule: Prepared by or under the 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.
- F. Qualification Data: For qualified Installer.
- G. Welding certificates.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
- I. Source quality-control reports.
- J. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
- K. Warranties: Sample of special warranties.
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved by the Manufacturer for installation of units required for this Project.
  - B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
  - C. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
  - D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect.
- E. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
- F. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration caused by thermal movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Adhesive or cohesive sealant failures.
    - e. Water leakage through fixed glazing and framing areas.
    - f. Failure of operating components.
  2. Warranty Period: 5 years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
  1. Warranty Period: 20 years from date of Substantial Completion.

## 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, but are not limited to, the following:
1. Kawneer North America; an Alcoa company.
  2. YKK AP America Inc. (Basis of Design) YES 45 FI System Exterior, YES40FS System Interior
  3. EFCO Corporation.
  4. Tubelight, Inc.
  5. Coral Architectural Products
  6. Or approved equal

### 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
  2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  3. Extruded Structural Pipe and Tubes: ASTM B 429.
  4. Structural Profiles: ASTM B 308.
  5. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Steel Reinforcement: 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.
1. Structural Shapes, Plates, and Bars: ASTM A 36.
  2. Cold-Rolled Sheet and Strip: ASTM A 1008.
  3. Hot-Rolled Sheet and Strip: ASTM A 1011/A.

### 2.3 FRAMING SYSTEMS

- A. Framing Members Exterior Frames: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
  2. Glazing System: Retained mechanically with gaskets on four sides.
  3. Glazing Plane: Front.



- B. Framing Members Interior Frames: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Non Thermally broken.
  - 2. Glazing System: Retained mechanically with gaskets on four sides.
  - 3. Glazing Plane: Center
  - 4. Size: 2"x4" frame system.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
- E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123 or ASTM A 153.
- F. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- G. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
  - 1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

#### 2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
  - 1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

- a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- b. Color: Matching structural sealant.

## 2.5 ENTRANCE DOOR SYSTEMS-EXTERIOR

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing 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: Medium stile; 3.5 to 4-inch nominal width.
    - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
  3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide non-removable glazing stops on outside of door.
- B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

## 2.6 ENTRANCE DOOR SYSTEMS-INTERIOR

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing 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: Medium Stile, 3.5 to 4 inch nominal width
    - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
  3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide non-removable glazing stops on outside of door.
- B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

## 2.7 ENTRANCE DOOR HARDWARE

- A. General: Provide entrance door hardware for each entrance door to comply with requirements and as indicated.
  - 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.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
  - 1. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- C. Opening-Force Requirements:
  - 1. Latches and Exit Devices: Not more than 15 lbf required to release latch.
- D. Pivot Hinges: BHMA A156.4, Grade 1.
  - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Manual Flush Bolts: BHMA A156.16, Grade 1.
- G. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.
- H. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- I. Cylinders: BHMA A156.5, Grade 1.
  - 1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE" to be furnished by Owner.
- J. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- K. Operating Trim: BHMA A156.6.

- L. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- M. Concealed Overhead Holders: BHMA A156.8, Grade 1.
- N. Surface-Mounted Holders: BHMA A156.16, Grade 1.
- O. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- P. Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
  - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- Q. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- R. Silencers: BHMA A156.16, Grade 1.
- S. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.
- T. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

## 2.8 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."
  - 1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

## 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. Framing Members, General: 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. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Provisions for field replacement of glazing from interior.
  - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
  - 1. At exterior doors, provide compression weather stripping at fixed stops.
  - 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- F. 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.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.10 ALUMINUM FINISHES

- A. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2604 and 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.
  - 1. Color and Gloss: As selected by Architect from manufacturer's standard color selections.
    - a. Interior storefront and exterior storefront will be two different colors.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

##### A. General:

- 1. Comply with manufacturer's written instructions.
- 2. Do not install damaged components.
- 3. Fit joints to produce hairline joints free of burrs and distortion.
- 4. Rigidly secure non-movement joints.
- 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
- 6. Seal joints watertight unless otherwise indicated.

##### B. Metal Protection:

- 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
- 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

##### C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

##### D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

##### E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

##### F. Install glazing as specified in Division 08 Section "Glazing."

##### G. Entrance Doors: Install 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.

- H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

### 3.3 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
  - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
  - 2. Alignment:
    - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
  - 1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.
  - 2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft., and shall not evidence water penetration.
  - 3. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- C. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.
  - 1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

3.6 ENTRANCE DOOR HARDWARE SETS

- A. Refer to specification Section 087100 Door Hardware for scheduled hardware.

END OF SECTION 084113



## SECTION 085313 - VINYL WINDOWS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes vinyl-framed Single Hung and Fixed Glass windows.
- B. All work under this section must comply with and be registered under the Florida Product Approval, herein referred to as Code. Particular attention should be given to the Wind Zone requirements of the FBC for the location in which the Project is located, Alachua County, FL.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide vinyl windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of sizes required for project.
- B. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
  - 1. Design pressure number in pounds force per square foot used to determine the structural test pressure and water test pressure.
- C. Structural Performance: Provide vinyl windows capable of withstanding wind pressures as shown in wind pressure diagrams on the drawings and the following:
  - 1. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to the latest version of ASCE 7, and requirements of the authorities having jurisdiction.
    - a. Basic Wind Speed: as indicated on the Structural Drawings.
  - 2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure base don testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations.
- D. Delegated Design: Design vinyl windows, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- E. **Safety: All operable windows on the second and third levels whose operable opening window sills are lower than 36" above the finished floor are required by the FBC to have permanent opening limiting device meeting ASTM F2090 to limit the window opening to 4", while not reducing the net clear opening for emergency egress of 20" in width.**

### 1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, and the following:
  - 1. Mullion details, including reinforcement and stiffeners.
  - 2. Joinery details.
  - 3. Expansion provisions.
  - 4. Flashing and drainage details.
  - 5. Weather-stripping details.
  - 6. Glazing details.
  - 7. Window opening tamper proof limiting device.
  - 8. Window cleaning provisions.
  - 9. For installed products indicated to comply with design loads, include structural analysis data prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of vinyl windows, and used to determine structural test pressures and design pressures from basic wind speeds indicated.
- C. Product Schedule: For vinyl windows. Use same designations indicated on Drawings.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, class, grade, and size of vinyl window. Test results based on use of downsized test units will not be accepted.
- E. Windows are to be certified as **Energy Star** rated.
- F. Maintenance Data: For operable window sash and finishes to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to vinyl window manufacturer for installation of units required for this Project.
- B. Engineering Responsibility: Preparation of data for vinyl windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- C. Manufacturer Qualifications: A manufacturer capable of fabricating vinyl windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- D. Source Limitations: Obtain vinyl windows through one source from a single manufacturer.
- E. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass

Doors”, for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Provide AAMA-certified vinyl windows with an attached label.
- F. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA’s “Glazing Manual” unless more stringent requirements are indicated.
- G. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup for type(s) of vinyl window indicated in locations(s) as mutually agreed by Contractor, Architect and Owner. Coordinate mockup installation with application and installation of applied components of exterior applied materials, accessories and sequences.
  2. Acceptance of mockup(s) does not constitute acceptance of deviations from the Contract Documents contained in mockup(s).

## 1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements.
    - b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
    - c. Faulty operation of movable sash and hardware.
    - d. Deterioration of vinyl, other materials, and finishes beyond normal weathering.
    - e. Failure of insulating glass.
  2. Warranty Period:
    - a. Window: Ten (10) years from date of Substantial Completion.
    - b. Glazing: Ten (10) years from date of Substantial Completion.
    - c. Vinyl Finish: Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Mi Windows and Doors, LLC. (Basis of Design) Series 3540 Single Hung Fin, Reinforced, Non-Impact, FL17676.1, Fixed Glass windows using same frame profile.
  2. Custom Window Systems, Inc.
  3. PGT Industries

4. JELD-WEN, Inc.
5. Atrium Companies, Inc.
6. Alside Window Systems
7. Eastern Architectural Systems
8. Doers Window Manufacturing

## 2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440.
  1. See structural drawings for minimum component wind load design requirements.
- B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.33 Btu/sq. ft. x h x deg F.
- C. Condensation-Resistance Factor (CRF): Provide vinyl windows tested for thermal performance according to AAMA 1503, showing a CRF of 52.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.27 for single hung, and an SHGC of 0.27 for fixed.

## 2.3 VINYL WINDOWS

- A. Operating Types: Fixed and single hung as indicated on Drawings.
- B. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA / WDMA / CSA 101 / I.S.2 / A440.
  1. Finish: Integral color, to be determined.
- C. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.
  1. Kind: Fully tempered where indicated on Drawings or required by Florida Building Code.
- D. Insulating-Glass Units: ASTM E 2190.
  1. Glass: ASTM C 1036, Type 1, Class 1, q3.
    - a. Tint: Clear, unless noted otherwise.
    - b. Kind: Fully tempered where indicated on Drawings.
  2. Filling: Fill space between glass lites with air or argon to meet U-Factor and SHGC values indicated.
  3. Glass System: Double pane, HP Low E clear Glass.

- E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- F. Hardware, General: Manufacturer's standard corrosion-resistant material sized to accommodate sash weight and dimensions. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Window Hardware:
  - 1. Operable Windows in public spaces, offices and residential units must be able to be opened with no higher than a 48" reach and with no greater than 5 lbs of pressure.
  - 2. Locks and Latches: Operated from the inside only.
  - 3. Window Safety Restrictors: All windows on second and third levels whose sills are less than 36" AFF must have devices limiting the opening to 4" or less meeting ASTM F2090. The device selected must be pre-installed on a window by the manufacturer to confirm that the device will attach properly and perform as intended.
    - a. A potential manufacturer of a window restrictor that may be considered, depending on compatibility with the window selected, is the Angel Ventlock, by Mighton Products, LTD. / Roto Frank of America, 14 Inspiration Lane, Chester, CT., 06412
- H. Weather Stripping: Provide full-perimeter 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 the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

## 2.4 INSECT SCREENS

- A. General: Fabricate insect screens to fully integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
  - 1. Type and Location: Half, outside for single-hung sashes.
- B. Aluminum Frames: Complying with SMA 1004 or SMA 1201.
  - 1. Finish for Exterior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range matching window frames.
- C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh complying with ASTM D 3656. Mesh Color: Manufacturer's standard.

## 2.5 FABRICATION

- A. Fabricate vinyl windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

1. Welded Frame and Sash Corners: Miter-cut and fusion or chemically welded.
- B. Fabricate vinyl windows that are reglazable without dismantling sash or ventilator framing.
- C. Glaze vinyl windows in the factory.
- D. Weather strip each operable sash to provide weathertight installation.
- E. Provide cover plates, compatible with 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 cover plates capable of withstanding design wind loads of window units. Provide manufacturer's standard finish to match window units.
- F. Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant reinforcement.
- G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.
- H. Integral Vinyl Finish and Color: Uniform, solid, homogeneous color as selected, interior and exterior.

### 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 work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation. 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 E 2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weather tight construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

- D. Separate aluminum and other co-ordible surfaces of corrosion or electrolytic action at points of contact with other materials.
- E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- F. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
- G. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

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Table 3  
Optional performance grades (design pressure)  
(See Clauses 4.4.2.6.2 and 4.4.3.4.)

Performance class and optional performance grades					Design pressure		Structural test pressure		Water penetration resistance test pressure			
									R, LC, C, HC		AW	
R	LC	C	HC	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
20	—	—	—	—	960	(20.00)	1 440	(30.00)	150	(3.00)	—	—
25	—	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
30	30	—	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
45	45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
60	60	60	60	60	2 880	(60.00)	4 320	(90.00)	440	(9.00)	580	(12.00)
65	65	65	65	65	3 120	(65.00)	4 680	(97.50)	470	(9.75)	580	(12.00)
70	70	70	70	70	3 360	(70.00)	5 040	(105.00)	510	(10.50)	580	(12.00)
75	75	75	75	75	3 600	(75.00)	5 400	(112.50)	540	(11.25)	580	(12.00)
—	80	80	80	80	3 840	(80.00)	5 760	(120.00)	580	(12.00)	580	(12.00)
—	85	85	85	85	4 080	(85.00)	6 120	(127.50)	580	(12.00)	580	(12.00)
—	—	90	90	90	4 320	(90.00)	6 480	(135.00)	580	(12.00)	580	(12.00)
—	—	—	95	95	4 560	(95.00)	6 840	(142.50)	580	(12.00)	580	(12.00)
—	—	—	100	100	4 800	(100.00)	7 200	(150.00)	580	(12.00)	580	(12.00)
—	—	—	—	No limit*	No limit*	No limit*	1.5 × design pressure	1.5 × design pressure	580	(12.00)	580	(12.00)

(Continued)



## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:
  - a. Swinging doors.
2. Cylinders for door hardware specified in other Sections.
3. Unit door hardware by Cal-Royal Products; lever style, ROC, US15 (619) Satin Nickel
4. Exterior door hardware by Cal-Royal; lever style is RL, US26D (626) Satin Chrome.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Door Hardware: Three (3) sets of locksets and closers hardware for Unit Entry and Interior.

#### 1.4 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- B. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation to exit.
- C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC/ANSI A117.1.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

2. Comply with the following maximum opening-force requirements:
  - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
  - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
  - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: Life-time from date of Substantial Completion on Grade 1 and 2.
    - a. Exit Devices: Lifetime years from date of Substantial Completion.
    - b. Manual Closers: Lifetime from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
  1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
  1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
  2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

### 2.2 HINGES, SELF-CLOSING HINGES (SPRING HINGES), AND PIVOTS

- A. Hinges: Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
  - a. CRP, Inc.
  - b. PBB, Inc. (Basis of Design)
  - c. IVES Hardware; an Ingersoll-Rand company.
  - d. McKinney Products Company; an ASSA ABLOY Group company.
  - e. Stanley Commercial Hardware; Div. of The Stanley Works.

## 2.3 CONTINUOUS HINGES

- A. Continuous Hinges: Minimum 0.120-inch thick, hinge leaves with minimum overall width of 4-3/4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

## 2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- C. Lock Backset: 2-3/4 inches, unless otherwise indicated.
- D. Lock Trim:
  1. Description: Unit Entry and Interior: as indicated in schedule.
  2. Description: Common Area; Lever and Rosette as indicated in schedule.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latch bolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
- F. Bored Locks: Grade 1 & Grade 2;
  1. Manufacturers: provide product indicated as Basis of Design, but are not limited to, the following:
    - a. Cal-Royal (Basis of Design)
    - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
    - c. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group Company
    - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

## 2.5 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items:

1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
  - a. Cal-Royal Products (Basis of Design)
  - b. Von Duprin
  - c. Security Door Controls.
  - d. Detex Corp.
  - e. Jackson Exit Devices, an CR Laurence Company

## 2.6 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
  1. Manufacturer: Same manufacturer as for locking devices.
  2. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. Cal-Royal Products. (Basis of Design)
    - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
    - c. Corbin Russwin Architectural Hardware
    - d. SARGENT Manufacturing Company
- B. Lock Cylinders: Grade 1; cylinders that are as specified in the schedule; face finished to match lockset with Schlage C keyway 6 pin.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

## 2.7 KEYING

- A. Keying System:
  1. As indicated by Owner.

## 2.8 KEY CONTROL SYSTEM

- A. Key Control Cabinet: As indicated by Owner.
- B. Key Lock Boxes: Designed for storage of two keys, with tamper switches to connect to intrusion detection system.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. GE Security, Inc.
    - b. HPC, Inc.
    - c. Knox Company.

## 2.9 SURFACE CLOSERS

- A. Surface Closers: Rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. Cal-Royal (Basis of Design)
    - b. DORMA
    - c. LCN, an Ingersoll Rand Company.
    - d. Norton Door Controls, an Assa Abloy Group company.

## 2.10 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: Brass, base metal.
1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. CRP (Basis of Design)
    - b. Burns Mftg
    - c. IVES Hardware; an Ingersoll-Rand company.
    - d. Rockwood Manufacturing Company.
    - e. Stanley Commercial Hardware; Div. of The Stanley Works.
    - f. Trimco.

## 2.11 DOOR GASKETING

- A. Door Gasketing: Air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. KN Crowder
    - b. National Guard Products.
    - c. Pemko Manufacturing Co.; an Assa Abloy Group company.
    - d. Zero International.

## 2.12 THRESHOLDS

- A. Thresholds: Fabricated to full width of opening indicated.

1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
  - a. Pemko Manufacturing Co.; an Assa Abloy Group company.
  - b. Zero International.
  - c. KN Crowder

#### 2.13 POCKET DOOR HARDWARE

- A. Pocket Door Hardware: consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
  1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a.
    - b. KN Crowder (Basis of Design)
    - c. Cox, Arthur, & Sons, Inc.
    - d. Henderson, PC Inc.

#### 2.14 BI-FOLDING DOOR HARDWARE

- A. General: Complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.
  1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. KN Crowder (Basis of Design)
    - b. Cox, Arthur, & Sons, Inc.
    - c. Henderson, PC Inc.

#### 2.15 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware
  1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. Burns (Basis of Design)
    - b. CRP
    - c. Baldwin Hardware Corporation.
    - d. Rockwood Manufacturing Company.
    - e. Stanley Commercial Hardware; Div. of The Stanley Works.
    - f. Trimco.

#### 2.16 FINISHES

- A. Provide finishes as indicated in door hardware schedule.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
- C. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- F. Lock Cylinders: Install construction cores to secure building and areas during construction period.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant.
- H. Stops: Provide wall/floor/hinge stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- L. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.3 DOOR HARDWARE SCHEDULE

- 1. Manufacturers: Subject to compliance with requirements, provide product indicated on schedule or comparable product:

**UNIT ROOMS**

**Door Hardware Set No. U1**

3	Each	Hinges BB31 4.5 x 4.5	613	CRP
1	Each	Passage ROC30	613	CRP
1	Each	Dead Bolt T360	613	CRP
1	Each	Closer 300 BFCOV	DURO	CRP
1	Each	Floor Stop DSLP4	613	CRP
1	Each	Sec. Dr. Guard w/ Edge Pro SBG00	613	CRP
1	Each	Viewer 200 Deg. PRIULDV200**	613	CRP
1	Set	Seals 2525D	D	NGP
1	Each	Hospitality Door Bottom 344NF	BLK	NGP
1	Each	Threshold 401	BLK	NGP
Provide upgrade costing for the following:				
1	Each	Electronic Dead Bolt InSync D	613	Kaba

**Door Hardware Set No. U2**

3	Each	Hinges RH35B 3.5 X 3.5	613	CRP
1	Each	Privacy ROC 20	613	CRP
1	Each	Stop SOFS3	613	CRP
1	Each	Hinge Pin JHP11 * as required	613	CRP
3	Each	Silencers DSW85	Rubber	CRP

**Door Hardware Set No. U3**



3	Each	Hinges RH35B 3.5 X 3.5	613	CRP
1	Each	Passage/Closet ROC 30	613	CRP
1	Each	Stop SOFS3	613	CRP
3	Each	Silencers DSW85	Rubber	CRP

**Door Hardware Set No. U4**

6	Each	Hinges RH35B 3.5 X 3.5	613	CRP
2	Each	Adj Ball Catch DIB1	613	CRP
2	Each	Dummy ROC 40	613	CRP
2	Each	Stop SOFS3	613	CRP
3	Each	Silencers DSW85	Rubber	CRP

**Door Hardware Set No. U5**

1	Kit	Folding Door CF-115 4 doors	US28	KNC
2	Each	Bi-fold Ball Knob BK14	613	CRP
2	Each	Back Plate PLA2	613	CRP

**Door Hardware Set No. U6**

1	Kit	Pocket Door Type C	US28	KNC
1	Each	Pull C-40	613	KNC

**Door Hardware Set No. U7**

By Sliding Door Manufacturer

**Door Hardware Set No. U8**

By Sliding Door Manufacturer

**COMMON**

**Door Hardware Set No. C1**

1	Each	Cont. Hinge CG31	710	PBB
1	Each	Storeroom CSL05	613	CRP
1	Each	Closer N900PBF	DURO	CRP
1	Each	Kick Plate BKICK834	613	CRP
1	Each	Floor Stop 3CFS-85	613	CRP
1	Each	Threshold 896	628	NGP
1	Set	Seals 5050C	D	NGP
1	Each	Door Sweep 600	613	NGP
1	Each	Rain Drip CR4462	613	CRP
		FPA: FL13922		

**Door Hardware Set No. C2**

1	Each	Cont. Hinge CG31	710	PBB
1	Each	Storeroom CSL05	613	CRP
1	Each	OH Stop CR552S	613	CRP
1	Each	Threshold 896	628	NGP
1	Set	Seals 5050C	D	NGP
1	Each	Door Sweep 600	613	NGP
1	Each	Rain Drip CR4462	613	CRP
		FPA: FL13922		

**Door Hardware Set No. Misc**

Provide InSync software, utility device, and RFID Card/keys as required by Owner.

**ALUMINUM STOREFRONT**

**Door Hardware Set AL1**

**Door Type: C1**

1	Each	Cont. Hinges DH111HD x Elect Trans	710	Coral
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1	ea	Electric Panic 2086-HREL	613	Jackson
1	ea	Closer 500BF x TJ	DURO	CRP
1	ea	Cyl. Mtg. Pad 30-821J	613	Jackson
1	ea	Cylinder AMORTCYL118MKD	613	CRP
1	ea	Pull PH401	613	Coral
1	ea	Floor Stop 3CFS85	613	CRP
1	ea	ADA Threshold TH4 x DP200-2	628	Coral
		Door Bottom Weather Sweep		
1	ea	WS142	613	Coral
1	Set	Seals Perimeter & Meeting	D	Coral
1	ea	Power Supply 30-2616	600	Jackson
1	ea	Reader - RCU-InSync	613	KABA
		FPA: # FL21418		

D OF SECTION 087100

## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:
  - a. Swinging doors.
  - b. Storefront and Aluminum Doors.
2. Cylinders for door hardware specified in other Sections.
3. Interior Door hardware by Cal-Royal Products; lever style, DOV, Satin Nickel

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Door Hardware: Three (3) sets of locksets and closers hardware for Unit Entry and Interior.

#### 1.4 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- B. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation to exit.
- C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC/ANSI A117.1.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

2. Comply with the following maximum opening-force requirements:
  - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
  - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
  - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

## 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: Life-time from date of Substantial Completion on Grade 1 and 2.
    - a. Exit Devices: Lifetime years from date of Substantial Completion.
    - b. Manual Closers: Lifetime from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
  1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
  1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
  2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

### 2.2 HINGES, SELF-CLOSING HINGES (SPRING HINGES), AND PIVOTS

- A. Hinges: Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
  - a. CRP, Inc.
  - b. PBB, Inc. (Basis of Design)
  - c. IVES Hardware; an Ingersoll-Rand company.
  - d. McKinney Products Company; an ASSA ABLOY Group company.
  - e. Stanley Commercial Hardware; Div. of The Stanley Works.

## 2.3 CONTINUOUS HINGES

- A. Continuous Hinges: Minimum 0.120-inch thick, hinge leaves with minimum overall width of 4-3/4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

## 2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- C. Lock Backset: 2-3/4 inches, unless otherwise indicated.
- D. Lock Trim:
  1. Description: Unit Entry and Interior: as indicated in schedule.
  2. Description: Common Area; Lever and Rosette as indicated in schedule.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latch bolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
- F. Bored Locks: Grade 1 & Grade 2;
  1. Manufacturers: provide product indicated as Basis of Design, but are not limited to, the following:
    - a. Cal-Royal (Basis of Design)
    - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
    - c. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group Company
    - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

## 2.5 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items:

1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
  - a. Cal-Royal Products (Basis of Design)
  - b. Von Duprin
  - c. Security Door Controls.
  - d. Detex Corp.
  - e. Jackson Exit Devices, an CR Laurence Company

## 2.6 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
  1. Manufacturer: Same manufacturer as for locking devices.
  2. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. Cal-Royal Products. (Basis of Design)
    - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
    - c. Corbin Russwin Architectural Hardware
    - d. SARGENT Manufacturing Company
- B. Lock Cylinders: Grade 1; cylinders that are as specified in the schedule; face finished to match lockset with Schlage C keyway 6 pin.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

## 2.7 KEYING

- A. Keying System:
  1. As indicated by Owner.

## 2.8 KEY CONTROL SYSTEM

- A. Key Control Cabinet: As indicated by Owner.
- B. Key Lock Boxes: Designed for storage of two keys, with tamper switches to connect to intrusion detection system.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. GE Security, Inc.
    - b. HPC, Inc.
    - c. Knox Company.

## 2.9 SURFACE CLOSERS

- A. Surface Closers: Rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. Cal-Royal (Basis of Design)
    - b. DORMA
    - c. LCN, an Ingersoll Rand Company.
    - d. Norton Door Controls, an Assa Abloy Group company.

## 2.10 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: Brass, base metal.
1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. CRP (Basis of Design)
    - b. Burns Mftg
    - c. IVES Hardware; an Ingersoll-Rand company.
    - d. Rockwood Manufacturing Company.
    - e. Stanley Commercial Hardware; Div. of The Stanley Works.
    - f. Trimco.

## 2.11 DOOR GASKETING

- A. Door Gasketing: Air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. KN Crowder
    - b. National Guard Products.
    - c. Pemko Manufacturing Co.; an Assa Abloy Group company.
    - d. Zero International.

## 2.12 THRESHOLDS

- A. Thresholds: Fabricated to full width of opening indicated.



1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
  - a. Pemko Manufacturing Co.; an Assa Abloy Group company.
  - b. Zero International.
  - c. KN Crowder

#### 2.13 BARN DOOR HARDWARE

- A. Barn Sliding Door Hardware: consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
  1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. KN Crowder (Basis of Design – Leasing Center) Load Capacity 300 lbs./door
    - b. Cal-Royal (Basis of Design – Staff Lounge) Load Capacity 175 lbs.
    - c. Rustic Sliding Door
    - d. Stone Harbor

#### 2.14 BI-FOLDING DOOR HARDWARE

- A. General: Complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.
  1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. KN Crowder (Basis of Design)
    - b. Cox, Arthur, & Sons, Inc.
    - c. Henderson, PC Inc.

#### 2.15 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware
  1. Manufacturers: provide product indicated as Basis of Design or comparable product, but are not limited to, the following:
    - a. Burns
    - b. CRP
    - c. Baldwin Hardware Corporation.
    - d. Rockwood Manufacturing Company.
    - e. Stanley Commercial Hardware; Div. of The Stanley Works.
    - f. Trimco.

#### 2.16 FINISHES

- A. Provide finishes as indicated in door hardware schedule.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
- C. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- F. Lock Cylinders: Install construction cores to secure building and areas during construction period.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant.
- H. Stops: Provide wall/floor/hinge stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- L. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.3 DOOR HARDWARE SCHEDULE

- 1. Manufacturers: Subject to compliance with requirements, provide product indicated on schedule or comparable product:
- 2. Insert additional requirements and sequence of operation in door hardware sets for electrified door hardware if required.

**Door Hardware Set No. 1**

Each pair to have:

2	Sets	Barn Door CRT102-SS 300 lbs. load	630	KNC
1	Each	Lockset C90L-CT	619	KNC
1	Each	Strike C90S-BB	619	KNC
1	Each	Cylinder MORTCYL118MKD	619	CRP

**Door Hardware Set No. 2**

Each door to have:

3	Each	Hinges BB81 4.5 x 4.5	646	PBB
1	Each	Storeroom DOV05	646	CRP
1	Each	Wall Stop CONWB42	646	CRP
3	Each	Silencers DSM21	Rubber	CRP

**Door Hardware Set No. 3**

Each door to have:

3	Each	Hinges BB81 4.5 x 4.5	646	PBB
1	Each	Privacy DOV20	646	CRP
1	Each	Kick Plate BKICK834	630	CRP
1	Each	Wall Stop WB26	646	CRP

3	Each	Silencers DSM21	Rubber	CRP
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**Door Hardware Set No. 4**

Each door to have:

3	Each	Hinges BB81 4.5 x 4.5	646	PBB
1	Each	Panic GLS7700	630	CRP
1	Each	Pull OFSTPUL-10	630	CRP
1	Each	Cylinder 98GLSCYL-1	630	
1	Each	Closer N900PBF x Regular	689	CRP
1	Each	Kick Plate KICK834	630	CRP
1	Each	Wall Stop WB26	646	CRP
3	Each	Silencers DSM21	Rubber	CRP

**Door Hardware Set No. 5**

Each pair to have:

6	Each	Hinges BB51NRP 4.5" x 4.5"	630	PBB
1	Set	Flip Bolt MF6341	646	CRP
1	Each	Storeroom CRL05	646	CRP
1	Each	Dead Bolt T360	646	CRP
2	Each	Closer N900PBF x SPA900	689	CRP
1	Each	Threshold 2001P	C	Pemko
1	Set	Seals 303A	628	NGP
1	Each	Metal Astragal	600	DKS
2	Each	Door Sweep 3151	628	Pemko
1	Pc	Astragal Seal S88	C	Pemko
		FPA: FL13624/13922		

**Door Hardware Set No. 6**

Each door to have:

1	Each	Cont. Hinge CG31	628	PBB
1	Each	HC Fire Exit F7700VEO36	630	CRP
1	Each	Trim SPAENTOOL	626	CRP
1	Each	Closer N900PBF	689	CRP
1	Each	Kick Plate KICK834	630	CRP
1	Each	Floor Stop 3CFS-85	630	CRP
1	Each	Threshold 2001P	C	Pemko
1	Set	Seals 303A	628	NGP
1	Each	Door Sweep 3151	628	Pemko
1	Each	Rain Drip CR446252	628	CRP
		FPA: FL13624/13922		

**Door Hardware Set No. 7**

Each door to have:

2	Each	Hinges BB51 NRP 4.5 x 4.5	630	PBB
1	Each	Elec. Hinge BB51EL 2+4	630	PBB
1	Each	Electric Lock NM8080-EU JS	646	CRP
1	Each	Closer N900PBF x Regular	689	CRP
1	Each	Kick Plate KICK834	630	CRP
1	Each	Floor Stop 3CFS-85	630	CRP
1	Each	Threshold 156	C	Pemko
1	Set	Seals 303A	628	NGP
1	Each	Door Sweep 3151	628	Pemko
1	Pc	Astragal Seal S88	C	Pemko
1	Each	Power Supply CRPS202	600	CRP
1	Each	Reader - RCU-InSync	630	KABA
		FPA: FL13624/13922		

**Door Hardware Set No. 8**

Each door to have:

1	Set	Barn Door SDH803582	630	CR
1	Set	Edge Pull x (2) Flush Pulls C-91-BB	646	KNC

**Door Hardware Set No. 9**

Each door to have:

3	Each	Hinges BB51 4.5 x 4.5	630	PBB
1	Each	Push Plate PSPL4016	630	CRP
1	Each	Pull Plate 1007ADA	630	CRP
1	Each	Closer/Stop N900PBF x SPA900	689	CRP
1	Each	Kick Plate KICK834	630	CRP
3	Each	Silencers DSM21	Rubber	CRP

**Door Hardware Set No. 10**

Each door to have:

3	Each	Hinges BB51NRP 4.5" x 4.5"	630	PBB
1	Each	Office CSPA00	646	CRP
2	Each	Closer N900PBF x SPA900	689	CRP
1	Each	Threshold 2001P	C	Pemko
1	Each	Kick Plate KICK834	630	CRP
1	Set	Seals 303A	628	NGP
1	Each	Door Sweep 3151 FPA: FL13624.3/13922	628	Pemko

**Door Hardware Set No. 11**

Each door to have:

3	Each	Hinges BB51 NRP 4.5 x 4.5	630	PBB
1	Each	HC Panic 7700VEO36	630	CRP
1	Each	InSync Trim CP	646	Kaba
1	Each	Closer N900PBF	689	CRP
1	Each	Kick Plate KICK1034	630	CRP
1	Each	Floor Stop 3CFS-85	630	CRP
1	Each	Threshold 2001P	C	Pemko

1	Set	Seals 303A	628	NGP
1	Each	Door Sweep 3151 FPA: FL13624/13922	628	Pemko

**Door Hardware Set No. 12**

Each door to have:

3	Each	Hinges BB81 4.5 x 4.5	646	PBB
1	Each	Office DOV00	646	CRP
1	Each	Wall Stop CONWB42	646	CRP
3	Each	Silencers DSM21	Rubber	CRP

**Door Hardware Set No. 13**

Each door to have:

3	Each	Hinges BB81 4.5 x 4.5	646	PBB
1	Each	Privacy DOV20	646	CRP
1	Each	Kick Plate BKICK834	630	CRP
1	Each	Wall Stop WB26	646	CRP
3	Each	Silencers DSM21	Rubber	CRP

**ALUMINUM STOREFRONT**

**Door Hardware Set AL1**

Each pair to have:

1	Each	Cont. Hinges DH111HD	710	Coral
1	Each	Cont. Hinges DH111HD x Elect Trans	710	Coral
1	Each	Electric Panic 2086-HREL	613	Jackson
1	Each	Panic 2086-HREL	613	Jackson
2	Each	Closer 500BF x TJ	Duro	CRP
1	Each	Cyl. Mtg. Pad 30-821J	613	Jackson

1	Each	Cylinder MORTCYL118MKD	613	CRP
2	Each	Pull PH401	613	Coral
2	Each	Floor Stop 3CFS85	613	CRP
1	Each	ADA Threshold TH4 x DP200-2	628	Coral
2	Each	Door Bottom Weather Sweep WS142	710	Coral
1	Set	Seals Perimeter & Meeting	613	Coral
1	Each	Power Supply 30-2616	600	Jackson
1	Each	Reader - RCU-InSync	630	KABA
		FPA: # FL21418		

**Door Hardware Set AL2**

Each door to have:

1	Each	Cont. Hinges DH111HD x Elect Trans	710	Coral
1	Each	Electric Panic 2086-HREL	613	Jackson
1	Each	Closer N900PBF x SPA900 X 950	Duro	CRP
1	Each	Cyl. Mtg. Pad 30-821J	613	Jackson
1	Each	Cylinder MORTCYL118MKD	613	CRP
1	Each	Pull PH401	613	Coral
1	Each	Floor Stop 3CFS85	613	CRP
1	Each	ADA Threshold TH4 x DP200-2	628	Coral
2	Each	Door Bottom Weather Sweep WS142	710	Coral
1	Set	Seals Perimeter & Meeting	613	Coral
1	Each	Power Supply 30-2616	600	Jackson
1	Each	Reader - RCU-InSync	630	KABA
		FPA: # FL21418		

**Door Hardware Set AL3**

Each pair to have:

2	Each	Cont. Hinges DH111HD	628	Coral
2	Each	Panic 2086-HR	630	Jackson
2	Each	Closer N900PBF x SPA900 X 950	689	CRP
1	Each	Cyl. Mtg. Pad 30-821J	630	Jackson
1	Each	Cylinder MORTCYL118MKD	630	CRP
2	Each	Pull PH401	630	Coral



2	Each	Floor Stop 3CFS85	630	CRP
1	Each	ADA Threshold TH4	628	Coral
2	Each	Door Bottom Weather Sweep WS142	628	Coral
1	Set	Seals Perimeter & Meeting		Coral

**Door Hardware Set No. AL4**

Each door to have:

1	Each	Cont. Hinges DH111HD	628	Coral
1	Each	Pull PH401	630	Coral
1	Each	Push Bar PB401	630	Coral
1	Each	Lock MS1850S	630	AR
1	Each	Cylinder AMORT118 MKD	630	CRP
1	Each	Cylinder TT.THMBMORT100xkc-S1	630	CRP
2	Each	Cyl. Comp. Ring MCCR1814	630	CRP
1	Each	Wall Stop CONWB42	630	CRP
1	Set	Seal by Storefront Frame Supplier	Rubber	Coral

**Door Hardware Set AL5**

Each door to have:

1	Each	Cont. Hinges DH111HD	628	Coral
1	Each	Pull PH401	630	Coral
1	Each	Push Bar PB401	630	Coral
1	Each	HO Closer N900PBF x TRACK x 950	689	Coral
1	Each	Wall Stop WB26	630	CRP
1	Set	Seals Perimeter		Coral

END OF SECTION 087100

## SECTION 088000 - GLAZING

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section includes:

1. Glass for windows, doors, interior borrowed lites, storefront framing and glazed curtain walls.
2. Glazing sealants and accessories.

#### 1.2 COORDINATION

- ##### A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### 1.3 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 Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- ##### D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.4 INFORMATIONAL SUBMITTALS

- ##### A. Preconstruction adhesion and compatibility test report.

#### 1.5 QUALITY ASSURANCE

- ##### A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

## 1.6 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.

## 1.7 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
1. Warranty Period: **10** years from date of Substantial Completion.
- B. 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: **10** years from date of Substantial Completion.
- C. 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 the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
1. Warranty Period: **10** years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. 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. Cardinal Glass Industries.
  2. Guardian Glass; SunGuard. Basis of Design
  3. Pilkington North America.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E1300.
  - 1. Design Wind Pressures: As indicated on Drawings.
  - 2. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
  - 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- 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. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  - 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  - 3. Visible Reflectance: Center-of-glazing values, according to 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. GANA 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. 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 IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements.

- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
- B. 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.
- C. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

## 2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.
  - 1. Sealing System: Dual seals.
  - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction

## 2.6 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
  - 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. [Dow Corning Corporation.](#)
  - b. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
  - c. [Pecora Corporation.](#)
  - d. [Sika Corporation.](#)
  - e. [Tremco Incorporated..](#)
- C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with 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, but are not limited to the following:
    - a. [BASF Corporation.](#)
    - b. [Dow Corning Corporation.](#)
    - c. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
    - d. [Pecora Corporation.](#)
    - e. [Sika Corporation.](#)
    - f. [Tremco Incorporated.](#)

## 2.7 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks:
1. Manufacturers standard with a Shore A durometer hardness of 85, plus or minus 5.
  2. Type recommended by sealant or glass manufacturer.
- C. Spacers:
1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
  2. Type recommended by sealant or glass manufacturer.
- D. Edge Blocks:
1. Neoprene with a Shore A durometer hardness per manufacturer's written instructions.
  2. Type recommended by sealant or glass manufacturer.

## PART 3 - EXECUTION

### 3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

### 3.2 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 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 by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.3 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.

### 3.4 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 come into 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.

### 3.5 MONOLITHIC GLASS SCHEDULE

- A. Glass Types:
  - 1. Minimum Thickness: 6mm
  - 2. Tint Color: Clear
  - 3. Provide fully tempered glass at doors and other locations where required by code or indicated in drawings.

### 3.6 INSULATING GLASS SCHEDULE

- A. Glass Type: Low-E-coated, clear insulating glass.
  - 1. Basis of Design Product:
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 6 mm and as required to meet project wind loads.
  - 4. Outdoor Lite: float glass.
  - 5. Interspace Content: Air or Argon.
  - 6. Indoor Lite: Clear Fully tempered float glass where required by Code or indicated in drawings.
  - 7. Low-E Coating: Location as provided by glass/window/sliding glass door provider.
  - 8. Winter Nighttime U-Factor: See insulation schedule.



9. Summer Daytime U-Factor: See insulation Schedule.
10. Solar Heat Gain Coefficient: See insulation Schedule.

END OF SECTION 088000

## SECTION 088300 - MIRRORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
  - 1. Float glass mirrors, See Interior Designer drawings for unit mirrors design and sizing.
  - 2. ADA mirrors: See toilet room accessory schedule.

#### 1.2 ACTION SUBMITTALS

- A. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 SILVERED FLAT GLASS MIRRORS

- A. Glass Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.

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. Arch Aluminum & Glass Co., Inc.
- b. Guardian Industries
- c. Lenoir Mirror Company.
- d. Venture Circle Enterprises

B. Clear Glass: Mirror Quality.

1. Nominal Thickness: 1/8"

C. Mirror Types:

1. Apartments and Ancillary Structures: Units provided with pencil edge mirrors, if not specified otherwise in the Interior Design drawings.
2. ADA Tilted mirrors in common area toilet rooms with stainless steel perimeter edging.

## 2.2 FABRICATION

- A. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

B. Mirror Edge Treatment:

1. Units: Rounded polished. Seal edges of mirrors with edge sealer.
2. Public Toilets: Stainless steel trim around 4 sides.

- C. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Wall-Mounted Mirrors: Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

- B. Protect mirrors from breakage and contaminating substances resulting from construction operations.

- C. Do not permit edges of mirrors to be exposed to standing water.

- D. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

- E. Wash exposed surface of mirrors before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

## 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 gypsum board assemblies.
- 2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
- 3. Resilient Channels

- B. Related Requirements:

- 1. Division 05 Section "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Provide Product engineering or testing data for the Gypsum Board Suspension system for suspended Gypsum board ceilings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For firestop tracks, from ICC-ES.

### 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 E 119 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 E 90 and classified according to ASTM E 413 by an independent testing agency.

## 2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.
  - 1. Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: 0.018 inch for general wall framing and 0.033 inch for door opening framing.
    - b. Depth: As indicated on Drawings.
  - 2. Dimpled Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: 0.025 inch.
    - b. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
  - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  - 2. Deflection Track: Steel sheet top runner 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.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
      - 2) Superior Metal Trim; Superior Flex Track System (SFT).
- D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the 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.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Fire Trak Corp.; Fire Trak System.
  - b. Grace Construction Products; FlameSafe FlowTrak System.
  - c. Metal-Lite, Inc.; The System.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.033 inch.
- F. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal 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.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.033 inch.
  2. Depth: 1-1/2 inches.
- H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
1. **Clark Deitrich RCSD channels** are to be used where resilient channels are indicated in UL assemblies and drawings. Any other resilient channel **must be accepted** by the Architect and Sound Consultant.
- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
1. Depth: 3/4 inch.
  2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
  3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.
- J. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.
- 2.3 SUSPENSION SYSTEMS
- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Hanger Attachments to Concrete:
1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that

imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

- a. Type: Post-installed, expansion anchor.
2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch minimum by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch- wide flanges.
1. Depth: 2-1/2 inches.
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
  2. Steel Studs and Runners: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.018 inch for general wall framing and 0.033 inch for framing around doors.
    - b. Depth: As indicated on Drawings.
  3. Dimpled Steel Studs and Runners: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.025 inch.
    - b. Depth: As indicated on Drawings.
  4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    - a. Minimum Base-Metal Thickness: 0.033 inch.
  5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
    - a. **Clark Deitrich RCSD channels** are to be used where resilient channels are indicated in UL assemblies and drawings. Any other resilient channel **must be accepted** by the Architect and Sound Consultant.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Armstrong World Industries, Inc.; Drywall Grid Systems.
- b. Chicago Metallic Corporation; Drywall Grid System.
- c. USG Corporation; Drywall Suspension System.

## 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
  1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated.
  2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

## 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.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
  1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
  2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
  3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.



4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 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.
  1. Single-Layer Application: 24 inches o.c. unless otherwise indicated or as required by UL listing.
  2. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.
- 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 (runners) 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 penetrating partitions above ceiling.
  1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner 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 where required or indicated.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  3. 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.
  4. 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.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:
  - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
  - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c maximum.
- E. Direct Furring:
  1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c maximum or as indicated.
- F. Z-Furring Members:
  1. Erect insulation, specified in Division 07 Section "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches o.c.
  2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c maximum or as indicated.
  3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. 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.

### 3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  1. Hangers: 48 inches o.c.
  2. Carrying Channels (Main Runners): 48 inches o.c.
  3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

- a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  5. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: As indicated.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

## SECTION 092400 - PORTLAND CEMENT PLASTERING

### 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. Exterior portland cement plasterwork (stucco) on metal lath, unit masonry and monolithic concrete.
2. At frame locations: Zip System Sheathing system is the base weather and air barrier over the structural frame, then install one weather barrier layer under lath.

##### B. Related Sections:

1. Division 05 Section "Cold-Formed Metal Framing" for structural, load-bearing (transverse and axial) steel studs and joists that support lath and portland cement plaster.
2. Division 06 Section "Sheathing" for sheathing and water-resistant barriers included in portland cement plaster assemblies.
3. Division 07 Section "Thermal Insulation" for thermal insulations and vapor retarders included in portland cement plaster assemblies.
4. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support lath and portland cement plaster.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.

#### 1.4 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Where indicated, provide portland cement plaster assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

- B. Mockups: Before plastering, install mockups of at least 100 sq. ft. (9.3 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Install mockups for each type of finish indicated.
  - 2. Mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Preinstallation Conference: Conduct conference at Project site.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

#### 1.6 PROJECT CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
  - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
  - 2. Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).
  - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

### PART 2 - PRODUCTS

#### 2.1 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.
  - 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. Alabama Metal Industries Corporation; a Gibraltar Industries company.
    - b. CEMCO.
    - c. Clark Western Building Systems.
    - d. Dietrich Metal Framing; a Worthington Industries company.
    - e. MarinoWARE.
    - f. Phillips Manufacturing Co.
  - 2. Diamond-Mesh Lath: Self-furring, 3.4 lb/sq. yd.

## 2.2 ACCESSORIES

- A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with indicated thicknesses and number of plaster coats required.
- B. Plastic Accessories: Fabricated from high-impact PVC.
  - 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. Alabama Metal Industries Corporation; a Gibraltar Industries company.
    - b. Dietrich Metal Framing; a Worthington Industries company.
    - c. Phillips Manufacturing Co.
    - d. Plastic Components, Inc.
    - e. Vinyl Corp.
  - 2. Cornerbeads: With perforated flanges.
    - a. Small nose cornerbead; use unless otherwise indicated.
  - 3. Casing Beads: With perforated flanges in depth required to suit plaster bases indicated and flange length required to suit applications indicated.
    - a. Square-edge style; use unless otherwise indicated.
  - 4. Control Joints: One-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
  - 5. Expansion Joints: Two-piece type, formed to produce slip-joint and square-edged 1/2-inch- (13-mm-) wide reveal; with perforated concealed flanges.

## 2.3 MISCELLANEOUS MATERIALS

- A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in portland cement plaster.
- C. Bonding Compound: ASTM C 932.
- D. Steel Drill Screws: For metal-to-metal and metal to wood fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of no fewer

than three exposed threads for metal and embedment indicated in ASTM C 1063 and Adhered Stone manufacturer requirements over wood frame.

- E. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
- F. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter, unless otherwise indicated.
- G. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants"

## 2.4 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150, Type II.
  - 1. Color for Finish Coats: Grey.
- B. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- C. Sand Aggregate: ASTM C 897.
  - 1. Color for Job-Mixed Finish Coats: Grey.

## 2.5 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
  - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
  - 1. Portland Cement Mixes:
    - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
    - b. Brown Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Base-Coat Mixes (over low-absorption plaster bases such as concrete): Single base coats for two-coat plasterwork as follows:
  - 1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

- D. Base-Coat Mixes (over high-absorption plaster bases such as masonry): Single base coats for two-coat plasterwork as follows:
  - 1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
- E. Job-Mixed Finish-Coat Mixes:
  - 1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 1-1/2 to 2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
- F. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

### 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. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

#### 3.3 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
- B. Acoustical Sealant: Where required, seal joints between edges of plasterwork and abutting construction with acoustical sealant.

#### 3.4 INSTALLING METAL LATH

- A. Expanded-Metal Lath: Install according to ASTM C 1063.
  - 1. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.



### 3.5 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Reinforcement for External Corners:
  - 1. Install cornerbead at interior and exterior locations.
- C. Control Joints: Install control joints at locations indicated on Drawings and as required for proper spacing.
  - 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
    - a. Vertical Surfaces: 144 sq. ft.
    - b. Horizontal and other Non-vertical Surfaces: 100 sq. ft.
  - 2. At distances between control joints of not greater than 18 feet o.c.
  - 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
  - 4. Where control joints occur in surface of construction directly behind plaster.
  - 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
- D. Install Stucco on frame walls sheathed with the Zip System over one additional Weather Barrier membrane layer.

### 3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
  - 1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
  - 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
  - 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on unit masonry and concrete plaster bases.
- C. Walls; Base-Coat Mixes for Use over Metal Lath: three-coat plasterwork; 3/4-inch thickness plus 1/8" third textured finish coat for total 7/8" thickness.
- D. Ceilings; Base-Coat Mixes for Use over Metal Lath: three-coat plasterwork; 5/8" inch thickness including 1/8" textured finish coat.
- E. Masonry or Concrete Walls; three-coat plasterwork, 5/8 inch thickness including finish texture coat on concrete and concrete masonry.

- F. Plaster Finish Coats: Apply 1/8" finish Coat in texture selected by Architect for total stucco thickness of 7/8" over frame.
- G. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.
- H. Concealed Exterior Plasterwork: Where plaster application will be used as a base for adhered finishes, omit finish coat.

### 3.7 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

### 3.8 PROTECTION

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 092400

## 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. Texture finishes.

- B. Related Requirements:

- 1. Division 06 Section "Sheathing" for gypsum sheathing for exterior walls.
- 2. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product.

- B. Certification: Certificate of Origin for each type of product.

- C. Samples: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

#### 1.4 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

- 1. Install mockups for the following:

- a. Each level of gypsum board finish indicated for use in exposed locations.
- b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, accepted mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, 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, those that are moisture damaged, and those that are 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 E 119 by an independent testing agency.
  1. The Basis of Design products are selected based on the components allowed in that UL assembly. Any selection will require coordination with all other components, which could limit other materials. The Contractor shall be responsible for coordinating with the subcontractors the materials and products that may be accepted in the UL assembly indicated or as revised by Architect. It is highly critical that the total system selections involve review by for all materials and penetrations for their acceptance for use in the UL assembly.
  2. **The first floor level shall not be sheathed until ALL components going into the floor and ceiling assemblies have been reviewed and any changes suggested by the Contractor are submitted and reviewed as a shop drawing, then submitted to the Building Department and approved.**

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 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. Use materials from Manufacturers that are listed in the UL assemblies that are selected for the project. A basis of design manufacturer is indicated. Use of other manufacturers would be subject to providing replacement fire assembly testing data, acceptable to Architect and the authorities having jurisdiction, for review and acceptance.

## 2.3 INTERIOR GYPSUM BOARD

- 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 (alternate manufacturers other than the Basis of Design products must provide acceptable tested assembly data):
  - 1. Floor System
    - a. American Gypsum Company. (Basis of Design and Selection of UL Floor Ceiling Assembly-Acceptable if insulation 3.5" thick, Required if insulation over 3.5" thick)
    - b. Georgia-Pacific Gypsum LLC. (Basis of Design and Selection of UL Floor Ceiling Assembly-acceptable if insulation 3.5" thick)
  - 2. Roof System
    - a. United States Gypsum Company
    - b. CGC Inc.
- B. Wall Gypsum Board, Type X: ASTM C 1396
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Floor Ceiling Gypsum Board: ASTM C 1396
  - 1. Thickness: 5/8" Type AG-C
  - 2. Long Edges: Tapered
  - 3. Type: Type AG-C if insulation over 3.5" thick, Type TG-C allowed if insulation 3.5" thickness.
- D. Roof Ceiling Gypsum Board ASTM C 1396
  - 1. Thickness: 5/8 inch
  - 2. Long Edges: Tapered
  - 3. Type: Type C

- E. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
  - 1. Core: 5/8 inch.
  - 2. Long Edges: Tapered.
  - 3. Mold Resistance: ASTM D 3273, score of 10.

## 2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. C-Cure; C-Cure Board 990.
    - b. CertainTeed Corp.; FiberCement BackerBoard.
    - c. FinPan, Inc.; Util-A-Crete Concrete Backer Board
    - d. National Gypsum Company, Permabase Cement Board.
    - e. USG Corporation; DUROCK Cement Board.
  - 2. Thickness: 5/8 inch.
  - 3. Mold Resistance: ASTM D 3273, score of 10.

## 2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

- A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CertainTeed Corp.; GlasRoc Sheathing.
    - b. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.
    - c. National Gypsum Company; Gold Bond, e(2)XP.
    - d. USG Corporation; Securock Glass Mat Sheathing.
  - 2. Core: 5/8 inch, Type X.
  - 3. Applied over Fire Rated Gypsum Board required for assembly fire rating.

## 2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet
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. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.
2. Shapes:
  - a. Cornerbead.
  - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

## 2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper or as recommended by panel manufacturer.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh or 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, rounded or beveled panel edges, 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 drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.

2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

## 2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Sound Attenuation Blankets: ASTM C 665, 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.
- C. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
    - b. Grabber Construction Products; Acoustical Sealant GSC.
    - c. Pecora Corporation; AC-20 FTR or AIS-919.
    - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    - e. USG Corporation; SHEETROCK Acoustical Sealant.
  2. Acoustical joint sealant shall have a VOC content of 250g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

## 2.9 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CertainTeed Corp.; ProRoc Easi-Tex Spray Texture.
    - b. USG Corporation; BEADEX FasTex Wall and Ceiling Spray Texture.
  2. Texture: Orange Peel or Light Knock-down as selected by Owner.



### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- 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 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- 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. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. 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.
- G. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- H. 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 C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Wallboard Type: As indicated on Drawings.
  2. Type X: As indicated on Drawings and where required for fire-resistance-rated assembly.
  3. Moisture- and Mold-Resistant Type: As indicated on Drawings and at all wet location walls.
- 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 as 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.
    - b. At high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
  3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  4. Fastening Methods: Apply gypsum panels to supports with steel drill screws or as indicated.

### 3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports unless otherwise indicated.
1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
  2. Fasten with corrosion-resistant fasteners and as indicated.

### 3.5 INSTALLING 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 C 840 and in specific locations acceptable to Architect for visual effect.
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
  2. LC-Bead: Use at exposed panel edges.

3. L-Bead: Use where indicated.
4. U-Bead: Use where indicated.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

### 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, rounded or beveled edges, 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 C 840:
  1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in other Division 09 Sections.
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

### 3.7 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching accepted mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.8 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 093000 – CERAMIC TILE

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Ceramic tile; bathtub surrounds (to ceiling); including 24” towel bar and soap dish
2. Ceramic tile; shower walls (to ceiling); including 24” towel bar and soap dish.
3. Waterproofing, sound, and crack isolation membrane.
4. Setting Materials
5. Ceramic Floor and sanitary base in bathrooms.
6. Other tile areas as indicated in Interior Design Drawings.

#### 1.2 SUBMITTALS

##### A. Product Data: For each type of product indicated.

##### B. Samples:

1. Each type and composition of tile and grout for each color and finish required.

##### C. Material Test Reports: For each membrane, tile-setting and grouting product.

##### D. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 2 percent of amount installed for each type, composition, color, pattern, and size indicated.

#### 1.3 QUALITY ASSURANCE

##### A. Source Limitations for Tile: Obtain tile of each type and color or finish from one 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 one manufacturer and each aggregate from one source of producer.

##### C. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

- D. Environmental Limitations: Do not install tile until construction is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.1 TILE PRODUCTS

A. Tile Type – See Interior Design Drawings.

1. Manufacturers, Face Size, Tile Color, pattern & Grout Color: As selected by Owner/Interior Designer.
2. Composition: Vitreous or impervious natural clay or porcelain.
3. Thickness: Manufacturer's standard.
4. Face: Plain with square or cushion edges or as specified by Interior Designer.

B. Tile Type: Glazed wall and floor tile – See Interior Design Drawings.

1. Manufacturers: Face Size, Tile Color and Pattern & Grout Color: As selected by Owner/Interior Designer
2. Thickness: Manufacturer's standard.
3. Face: Plain with cushion edges or as indicated by Interior Designer.
4. Finish: As selected by Interior Designer
5. Mounting: Factory, back mounted.
6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as indicated and, selected from manufacturer's standard shapes:

### 2.2 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.

B. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

1. Description: As selected by Owner.

### 2.3 WATERPROOFING, SOUND, AND CRACK-SUPPRESSION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
1. Waterproofing Membrane: Install at all bathrooms under thin set tile floors and turn up walls 2" to seal corners and GWB.
    - a. Laticrete, Hydroban
  2. Sound and Crack Isolation Membrane Description: Laticrete 170 Sound and Crack Isolation membrane or equal for elevated floors over living units.

### 2.4 SETTING MATERIALS

- A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:
    - a. Boiardi Products; a QEP company.
    - b. Bonsal American; an Oldcastle company.
    - c. Bostik, Inc.
    - d. Custom Building Products.
    - e. Laticrete International, Inc.
    - f. MAPEI Corporation.
    - g. Southern Grouts & Mortars, Inc.
    - h. Summitville Tiles, Inc.
  2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:
    - a. Bonsal American; an Oldcastle company.
    - b. Bostik, Inc.
    - c. Custom Building Products.
    - d. Laticrete International, Inc.
    - e. MAPEI Corporation.
    - f. Mer-Kote Products, Inc.
    - g. Southern Grouts & Mortars, Inc.
  2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
  3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

## 2.5 GROUT MATERIALS

- A. Polymer-Modified Tile Grout: ANSI A118.7.
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, the following:
    - a. Boiardi Products; a QEP company.
    - b. Bonsal American; an Oldcastle company.
    - c. Bostik, Inc.
    - d. Custom Building Products.
    - e. Laticrete International, Inc.
    - f. MAPEI Corporation.
    - g. Southern Grouts & Mortars, Inc.
  - 2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.

## 2.6 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the applicable requirements in Division 07 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

## 2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.



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.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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 thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that is sloped 1/4 inch per foot (1:50) toward drains.

### 3.3 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic Tile Installation" for TCNA installation methods.
  1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors in wet areas.
    - b. Tile floors composed of tiles 8 by 8 inches or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures, including kitchen and bathroom base cabinets designated to be removable on drawings, 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. Lay tile in grid pattern unless otherwise indicated. See Interior Design Drawings for patterns. Align joints where adjoining tiles on floor, base, walls, and trim are the same size.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  1. Paver Tile: 3/16 inch or as indicated, or as indicated in Interior Design Drawings.
  2. Glazed Wall and Floor Tile: 1/8 inch or as indicated in Interior Design Drawings.

- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Expansion Joints: Provide expansion joints, including control, contraction, and isolation joints, where required by installation method employed. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them. Prepare joints and apply sealants.
- I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile and where threshold is not indicated.
  - 1. Install Schluter strips where tile stops at outside corners and no tile trim piece is available. See Interior Design Drawings for finish.

### 3.4 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove latex-portland cement 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 cleaners 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.
- B. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Restrict foot and wheel traffic from tiled floors during construction. Before final inspection, rinse neutral protective cleaner from tile surfaces.

### 3.5 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installation, Concrete Slab.
  - 1. Tile Installation F113-11: Thin-set mortar on waterproof membrane: TCNA F113-11.
    - a. Tile Type: paver tile.
    - b. Thin-Set Mortar: Latex-portland cement mortar.
    - c. Grout: Polymer-modified grout.
- B. Interior Floor Installations, Wood Subfloor:
  - 1. Tile Installation F180-11 (similar): Thin-set mortar on gypsum underlayment and waterproof, sound isolation, crack-suppression membranes: TCNA A180-11 (similar).
    - a. Tile Type: Paver tile.
    - b. Thin-Set Mortar: Latex-portland cement mortar.
    - c. Grout: Polymer-modified grout.
- C. Interior Wall Installations, Wood Studs or Furring – Bathtub, shower walls:

1. Tile Installation B412-11: Thin-set mortar on cement backer board or coated glass-mat, water-resistant gypsum backer board: TCNA B412-11.
  - a. Tile Type: ceramic tile.
  - b. Thin-Set Mortar: Latex- portland cement mortar.
  - c. Grout: Polymer-modified grout.

END OF SECTION 093000

## SECTION 096519 - RESILIENT TILE AND STRIP FLOORING

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Vinyl strip flooring (LVT)
2. VINYL COMPOSITION FLOOR TILE (VCT)

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including installed product compliance with STC and IIC performance requirements indicated and adopted by the authorities having jurisdiction. Flooring products must be tested to provide minimum STC 50 and IIC 50 on all floors at corridors and at Living Units. Provide Testing Data.
- B. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- C. Product Schedule: For floor tile and strip flooring.
- D. Manufacturer's installation instructions for each type of floor product, performance requirement and installation condition.
- E. Qualification Data: For qualified Installer.
- F. Maintenance Data: For each type of floor tile and strip flooring product to include in maintenance manuals.

#### 1.3 MATERIALS MAINTENANCE SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Flooring Products: Furnish 1 box for every (50) fifty boxes or fraction thereof, of each type, color, and pattern of floor tile and strip flooring installed.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for flooring products and installations indicated.

- B. Fire-Test-Response Characteristics: Provide products identical to those tested for fire exposure performance and behavior by test method indicated and acceptable to the authorities having jurisdiction.
- C. Store flooring 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. Store flooring products on flat surfaces.

#### 1.5 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F in spaces to receive floor tile and strip flooring products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F.
- C. Close spaces to traffic during floor product installation.
- D. Close spaces to traffic for 48 hours after floor product installation.
- E. Install floor products after other finishing operations, including painting, have been completed.

#### PART 2 - PRODUCTS

##### 2.1 VINYL COMPOSITION STRIP FLOORING (LVT)

- A. Products: As Selected in Interior Design Drawings meeting project requirements.
- B. Tile Standard: ASTM F 1700 – 99 with sound reducing backing for use in all residential units, unless noted otherwise.
  - 1. Class: Class III, surface-decorated vinyl plank.

##### 2.2 VINYL COMPOSITION FLOOR TILE (VCT) – (storage rooms / MEP closets)

- A. Products: As selected in Interior Design Drawings meeting project requirements.
- B. Tile Standard: ASTM F 1066, Class 3, surface-pattern tile.
- C. Wearing Surface: Smooth.

- D. Thickness: 0.125 inch.
- E. Size: 12 by 12 inches unless indicated otherwise.
- F. Colors and Patterns: As selected by Architect from full range of industry colors.

### 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient floor product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
  - 1. Adhesives shall comply with the following limits for VOC content:
    - a. VCT and VP Adhesives: Not more than 50 g/L.
- C. Metal Edge Strips; Extruded aluminum with mill finish of height required to protect exposed edges of resilient flooring products and in maximum available lengths to minimize running joints.
- D. Transition strips; Manufacturer's standard accessory products for VP edge and direction transitions in the same finish color, texture and grain as the selected VP product.

## 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.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient floor products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient flooring products.
- B. Concrete and gypsum concrete floor underlayment Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor products until they are same temperature as space where they are to be installed.
1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Clean substrates to be covered by resilient products immediately before installation as recommended by the Manufacturer.

### 3.3 FLOOR PRODUCT INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor product, perform moisture tests as required by the manufacturer.
- B. Lay out flooring from center marks established with principal walls, discounting minor offsets, so product 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. Lay flooring products square with room axis unless otherwise indicated.
- C. Match flooring products for color and pattern by selecting products from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed products.
- D. Scribe, cut, and fit floor products according to manufacturer's written instructions and to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor products into toe spaces, door reveals, closets, and similar openings. Extend floor products 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 products as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install floor products on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and

pattern between pieces of floor product installed on covers and adjoining tiles. Tightly adhere product edges to substrates that abut covers and to cover perimeters.

- H. Adhere floor products to flooring substrates according to manufacturer's written instruction and using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning, polishing and protection of floor products.
- B. Perform the following operations immediately after completing floor product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Joint Sealant: Apply sealant to floor product installed perimeter and around columns, at door frames, and at other joints and penetrations.
- E. Cover floor products until Substantial Completion.

END OF SECTION 096519



## SECTION 096816 – SHEET CARPETING

### PART 1 – GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Sheet carpet, carpet cushion and accessories.
  - 2. Store carpet, carpet cushion and accessories in facility and under conditions as approved by Owner.
  - 3. Installation of carpet and accessories in locations and as scheduled by Interior Design Drawings.

#### 1.2 SUBMITTALS

- A. Product Data for each type of installation accessory specified. Submit methods of installation for each type of substrate.
- B. Samples: 12-inch square samples of each type of carpet materials required.
- C. For each unit (typical) and the Clubhouse, Contractor to submit a plan for his proposed seaming of carpet for review and approval by the Owner.

#### 1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain each type of carpet from one source and by a single manufacturer.
- B. Carpet and carpet cushion Fire-Test-Response Characteristics: Provide carpet and carpet cushion with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet and carpet cushion with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface Flammability: Passes CPSC 16 CFR, Part 1630.
  - 2. Flame Spread: 25 or less per ASTM E 84.
  - 3. Smoke Developed: 450 or less per ASTM E 84.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 5: "Storage and Handling."
- B. Store materials in facility approved by Owner.

- C. Deliver materials to Project site in original factory wrapping and containers, labeled with identification of manufacturer, brand name, and lot number. Do not store materials on site for more than one week.

## 1.5 WARRANTY

- A. Labor Warranty Period: 1 years from date of Substantial Completion.
- B. Manufacturer's Warranty Period: 5 Years

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide one of the following:
  - 1. See Interior Design Drawings for Manufacturer.

### 2.2 CARPET

- A. Products: See Interior Design Drawings.
  - 1. Style: Owner/Interior Designer selected.
  - 2. Color: Owner/Interior Designer selected.

### 2.3 CARPET CUSHION

- A. Products: Subject to compliance with requirements, provide minimum 6 lb density / 1/2" rated rebound pad materials recommended by selected carpet manufacturer.
  - 1. Style: See Interior Design Drawings.

### 2.4 INSTALLATION ACCESSORIES

- A. Concrete-Slab Primer: Nonstaining type as recommended by the carpet manufacturer and carpet cushion manufacturer.
- B. Trowelable Underlayments and Patching Compounds: As recommended by the carpet manufacturer and carpet cushion manufacturer.
- C. Tackless Carpet Stripping: Water-resistant plywood in strips as required to match cushion thickness and in compliance with CRI 104, 12.2.
- D. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams. Provide adhesive tape in minimum width of six (6) inches.

### 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 performance. Examine carpet for type, color, pattern, and potential defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Level subfloor within 1/8 inch in 10 feet, noncumulative, in all directions. Sand or grind protrusions, bumps, and ridges. Patch and repair cracks and rough areas. Fill depressions. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by the carpet manufacturer and carpet cushion manufacturer.
- B. Clean subfloors to be covered with carpet. Following cleaning, examine subfloors for moisture, alkaline salts, carbonation, or dust.

#### 3.3 INSTALLATION

- A. Comply with carpet manufacturer's recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position.
- B. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- C. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- D. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- E. Comply with carpet cushion manufacturer's written recommendations. Install carpet cushion seams at 90-degree angle with carpet seams.
- F. Perform the following operations immediately after completing installation.
  - 1. Remove visible adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove protruding yarns from carpet surface.
  - 3. Vacuum carpet.
- G. Provide instructions for final protection and maintenance.

END OF SECTION 096816

## SECTION 099113 - EXTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on exterior substrates and surfaces. Including but not necessarily limited to:
  - 1. Steel. (stairs, railings, lintels, bollards) – buildings
  - 2. Steel. Doors and frames
  - 3. Aluminum (not factory finished).
  - 4. Stucco
  - 5. Concrete and Masonry
  - 6. Cementitious Trim and Soffits
  - 7. Other Specialty Trim not factory finished

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. 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. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- C. Product List: For each product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

#### 1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: Five percent, but not less than 1 gal. of each material and color applied.

#### 1.4 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 specified in Part 3.
  - 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 acceptance of color selections will be based on mockups.
  - a. If preliminary color selections are not acceptable, apply additional mockups of additional colors selected by Architect at no added cost to Owner, limited to two additional color Mock ups.
3. Review of mockups does not constitute acceptance of deviations from the Contract Documents contained in mockups unless Architect specifically accepts such deviations in writing.
4. Subject to compliance with requirements, accepted mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 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: Basis of Design manufacturer, Subject to compliance with requirements, provide one of the following:
  1. Sherwin-Williams Company - (Basis of Design).
  2. Benjamin Moore & Co.
  3. Duron, Inc.
  4. Pittsburg Paints (PPG).
  5. Florida Paints.

- B. Products: Subject to compliance with requirements, provide Basis of Design product listed in other Part 3 articles for the paint category indicated or equivalent product by manufacturer listed in Article 2.1.A.

## 2.2 PAINT, GENERAL

### A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat 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 may 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, pH level of cementitious surfaces and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  1. 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 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. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Aluminum Substrates: Remove loose surface oxidation.
- F. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

- B. 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.
- C. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed to view:
    - a. Equipment, including panelboards and switch gear.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.

### 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 PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates indicated.
- B. Cementitious Siding and Trim:



1. Satin Latex Finish: 2 Finish Coats over Primer
  - a. 1st Coat: S-W Loxon Acrylic Primer, applied at a minimum 5.0 mils DFT.
  - b. 2nd Coat: S-W SuperPaint Latex, Exterior Latex Satin, A89 Series applied at a minimum 2 mils DFT.
  - c. 3<sup>rd</sup> Coat: S-W SuperPaint Latex, Exterior Latex Satin applied at a minimum 4 mils wet, 2 mils DFT.
  - d. Note: Primer not required on factory primed materials.
  
- C. Plastic Trim Fabrications:
  1. Satin Latex Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W Adhesion Primer, B51W8050 applied at a minimum 2.0 mils DFT.
    - b. 2nd Coat: S-W SuperPaint Latex, A89 Series applied at a minimum 2.0 mils DFT.
    - c. 3rd Coat: S-W SuperPaint Latex, A89 Series applied at a minimum 2.0 mils DFT.
  
- D. Ferrous Metal:
  1. Gloss Waterbased Urethane Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W Pro Industrial Pro-Cryl Universal Acrylic Primer, applied at a minimum 4.0 mils DFT.
    - b. 2nd Coat: S-W Pro-Industrial Urethane Alkyd Enamel applied at minimum 4.0 mils DFT.
    - c. 3rd Coat: S-W Pro-Industrial Urethane Alkyd Enamel applied at minimum 4.0 mils DFT.
  
- E. Aluminum
  1. Gloss Waterbased Urethane Finish: 2 Finish Coats over Primer
    - a. 1<sup>st</sup> Coat: S-W DTM Wash Primer, B71 Y1 applied at minimum 0.7 mils DFT.
    - b. 2<sup>nd</sup> Coat: S-W Waterbased Acrolon 100 Urethane, B65-720 Series applied at minimum 4.0 mils DFT.
    - c. 3<sup>rd</sup> Coat: S-W Waterbased Acrolon 100 Urethane, B650720 Series applied at minimum 4.0 mils DFT.
  
- F. Stucco (Portland Cement Plastering).
  1. Satin Latex Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W Loxon Concrete & Masonry Primer, A24W8300 applied at a minimum 5.0 mils DFT.
    - b. 2nd Coat: S-W SuperPaint Exterior Latex Satin, A89 Series
    - c. 3rd Coat: S-W SuperPaint Exterior Latex Satin, A89 Series 4.0 mils wet, 1.44 DFT per coat

EXTERIOR FINISH SCHEDULE – See Arch. Drawings for paint locations for all buildings			
FINAL COLOR SELECTIONS TO BE DETERMINED BY OWNER			
COLOR SCHEME	A		
	MANUFACTURER	SERIES / COLOR #	COLOR NAME
BASE PAINT	SHERWIN WILLIAMS	SW – 7551	GREEK VILLA
BODY COLORS	SHERWIN WILLIAMS	SW – 6071	POPULAR GRAY
ACCENT PAINT 1	SHERWIN WILLIAMS	SW – 6178	CLARY SAGE
	SHERWIN WILLIAMS	SW – 6221	MOODY BLUE
TRIM PAINT	SHERWIN WILLIAMS	SW – 6991	BLACK MAGIC
DOWNSPOUTS		PAINT ADJACENT COLOR	
FASCIA		SW – 6991	BLACK MAGIC
ROOFING	OWENS CORNING	TRUDEFINITION DURATION	ESTATE GRAY

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 interior substrates.
  - 1. Wood
  - 2. Gypsum board.
  - 3. Plaster.
- B. Related Requirements:
  - 1. Division 06 Sections for shop priming carpentry with primers specified in this Section.
  - 2. Division 08 Sections for factory priming doors with primers specified in this Section.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: Five 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 within temperature ranges as recommended by manufacturer.
  - 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 ranges as recommended by manufacturer.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds percentage recommended by manufacturer or at temperatures that are less than that recommended above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Basis of Design manufacturer, Subject to compliance with requirements, provide products manufactured by listed manufacturer or comparable products by one of the following, but not limited to:
  - 1. Benjamin Moore & Co.
  - 2. Pittsburg Paints (PPG).
  - 3. Sherwin-Williams Company (Basis of Design-Optimus Line).
  - 4. Florida Paints.
- B. Products: Subject to compliance with requirements, provide Basis of Design product listed in other Part 3 articles for the paint category indicated or equivalent product by manufacturer listed in Article 2.1.A.

2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Products shall comply with VOC limits stipulated, by the authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Nonflat Paints and Coatings: 150 g/L.
  - 3. Primers, Sealers, and Undercoaters: 200 g/L.
  - 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  - 5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
  - 6. Floor Coatings: 100 g/L.

- C. Colors Interior: As selected by Architect from manufacturer's full range.
  - 1. Apartment Units: See Interior Design Drawings for colors and locations.
  - 2. Common areas such as offices, club space and hallways: See Interior Design Drawings for colors and locations.

### 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 , must be limited as recommended by manufacturer.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Spray-Textured Substrates: Verify that surfaces are dry. Texture as indicated in Gypsum Board Section 092900.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions by contractors.

#### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates 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.
  - 2. Do not paint door hinges, strikes or other hardware.
- 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. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Aluminum Substrates: Remove loose surface oxidation.
- G. 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. 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.
- C. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work where exposed to Tenant accessed spaces:
  - 1. Paint the following work where exposed in occupied spaces:
    - a. Uninsulated metal piping.
    - b. Uninsulated plastic piping.
    - c. Pipe hangers and supports.
    - d. Metal conduit.
    - e. Plastic conduit.
    - f. Duct, equipment, and pipe insulation covering or other paintable jacket material.

- g. Repaint factory painted electrical load center panel covers and doors in dwelling units to match adjacent wall color or in color selected by Architect.
- h. Other items as indicated.

### 3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing 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.

### 3.5 PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates, as indicated.
- B. Concrete:
  - 1. Semi-Gloss Latex Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600 applied at minimum 1.5 mils DFT.
    - b. 2nd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss Enamel, B31-2600 Series applied at minimum 1.6 mils DFT.
    - c. 3rd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss Enamel, B31-2600 Series applied at minimum 1.6 mils DFT.
- C. Gypsum Drywall Systems, except for dwelling unit interiors:
  - 1. Flat Latex Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600 applied at minimum 1.5 mils DFT.
    - b. 2nd Coat: S-W ProMar 200 Zero VOC Latex Flat Wall Paint, B30W2600 applied at minimum 1.6 mils DFT minimum.
    - c. 3rd Coat: S-W ProMar 200 Zero VOC Latex Flat Wall Paint, B30W2600 applied at minimum 1.6 mils DFT minimum.
- D. Woodwork, except for dwelling unit interiors:
  - 1. Semi-Gloss Latex Finish: 2 Finish Coats over Primer

- a. 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 applied at minimum 1.8 mils DFT.
  - b. 2nd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss Enamel, B31-2600 Series applied at minimum 1.6 mils DFT.
  - c. 3rd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss Enamel, B31-2600 Series applied at minimum 1.6 mils DFT.
- E. Ferrous Metal:
1. Semi-Gloss Waterbased Alkyd Urethane Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series applied at minimum 4.0 mils DFT.
    - b. 2nd Coat: S\_W Pro Industrial Water Based Alkyd Urethane Semi-Gloss, B53-1150 Series applied at minimum 1.4-1.7 mils DFT.
    - c. 3<sup>rd</sup> Coat: S-W Pro Industrial Water Based Alkyd Urethane Semi-Gloss, B53-1150 Series applied at minimum 1.4-1.7 mils DFT  
Pro Industrial Water Based Alkyd Urethane Semi-Gloss, B53-1150 Series applied at minimum 1.4-1.7 mils DFT.
- F. Zinc-Coated Material:
1. Semi-Gloss Waterbased Alkyd Urethane Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W DTM Wash Primer, B71Y1 applied at minimum 0.7 mils DFT.
    - b. 2nd Coat: S\_W Pro Industrial Water Based Alkyd Urethane Semi-Gloss, B53-1150 Series applied at minimum 1.4-1.7 mils DFT.
    - c. 3<sup>rd</sup> Coat: S-W Pro Industrial Water Based Alkyd Urethane Semi-Gloss, B53-1150 Series applied at minimum 1.4-1.7 mils DFT
- G. Gypsum Drywall Systems, for dwelling unit interiors except gypsum board wall surfaces in bathrooms:
1. Eg-Shel Latex Finish: 2 Coats.
    - a. 1st Coat: S-W Property Solutions Interior Latex Eg-Shel, B20W03050 Series applied at a minimum 1.6 mils DFT.
    - b. 2nd Coat: S-W Property Solutions Interior Latex Eg-Shel, B20W03050 Series applied at a minimum 1.6 mils DFT.
- Note: Two coat application is subject to Owner acceptance of finish and coverage exhibited by completed field application.
- H. Gypsum Drywall Systems, Bathrooms:
1. Semi-Gloss Latex Finish: 2 Finish Coats over Primer
    - a. 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 applied at minimum 1.8 mils DFT.
    - b. 2nd Coat: S-W SOLO 100% Acrylic Eg-Shel, B75 Series applied at minimum 1.8 mils DFT.



- c. 3rd Coat: S-W SOLO 100% Acrylic Eg-Shel, B75 Series applied at minimum 1.8 mils DFT.

I. Woodwork, for dwelling unit interiors and gypsum board wall surfaces in bathrooms :

1. Eg-Shel Acrylic Finish: 1 Finish Coat over Primer
  - a. 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 applied at minimum 1.8 mils DFT.
  - b. 2nd Coat: S-W SOLO 100% Acrylic Eg-Shel, B75 Series applied at minimum 1.8 mils DFT.

Note: Two coat application is subject to Owner acceptance of finish and coverage exhibited by completed field application.

END OF SECTION 099123

## SECTION 099726 - CEMENTITIOUS COATINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and application of cementitious coating systems on high density EPS (Expanded Polystyrene) shapes.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: In each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, not less than 8 inches square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Product test reports.

#### 1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of at least 100 sq. ft. of coating system indicated and each color and finish selected.

### 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, but are not limited to the following:
  - 1. Marbelite International Corp. (Basis of Design)
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Cementitious Coating Schedule for the paint category indicated.
  - 1. StyroCrete (Basis of Design)

## 2.2 CEMENTITIOUS COATINGS

- A. Polymer-Modified Cementitious Coating: Containing portland cement, polymer, and hydrated lime or aggregates.
  - 1. Compressive Strength: Not less than 4850 psi at 28 days according to ASTM C 109.
  - 2. Tensile Strength: Not less than 475 psi at 28 days according to ASTM C 109/C 109M.
  - 3. Fire Retardant Test: Class A per ASTM E108.
- B. Colors: As indicated in a color schedule, to be field painted.
- C. Other Materials: Provide crack fillers, block fillers, and related materials that are compatible with cementitious finish-coat materials and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
  - 2. Factory apply coatings to shapes to the extent possible.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for mixing and preparing materials and as applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
  - 1. After completing coating 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 coatings, including dirt, oil, grease, incompatible coatings, and loose substrate materials.
- D. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.

### 3.3 APPLICATION

- A. Apply coatings according to manufacturer's written instructions. Use applicators and techniques suited for coating and substrate indicated.
- B. Apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:
  - 1. First Coat: Apply polymer-modified cementitious coating material to achieve a total cured thickness of 1/8"
  - 2. Second Coat: Apply polymer-modified cementitious coating material to achieve a total cured thickness of 1/8".
  - 3. Total cured thickness is required to be a minimum of 1/4" per manufacturer requirements.

### 3.4 CEMENTITIOUS COATING SCHEDULE

- A. EPS Shapes:
  - 1. Polymer-Modified Cementitious Coating:
    - a. Coat all EPS special shapes and brackets.
    - b. Factory prime and final finish to the maximum extent possible.
    - c. Field splice and finish joints as required to make seamless appearance on horizontal trim and banding.
    - d. Touch up damage as required

END OF SECTION 099726

## SECTION 101400 - SIGNAGE

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. This Section includes the following:

1. Panel signs for dwelling unit numbers adjacent to dwelling unit entries, Tenant accessible spaces and Common Area spaces to be provided by Owner.
2. Signage required by applicable codes and regulations to be provided by Contractor, to include all Mechanical and Services spaces.

#### 1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Acrylic sheet.
2. Polycarbonate sheet.
3. Die-cut vinyl characters and graphic symbols. Include representative samples of available typestyles and graphic symbols.

D. Sign Schedule: Provide schedule of signage and locations.

#### 1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.4 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within Five years from date of Substantial Completion.

1. Failures include, but are not limited to, the following:

- a. Deterioration of metal and polymer finishes beyond normal weathering.
- b. Deterioration of embedded graphic image colors and sign lamination.

- B. Labor Warranty Period: 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Sheet and Plate: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.
- B. Acrylic Sheet: Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
- C. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating.
- D. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils (0.076 mm) with pressure-sensitive adhesive backing, suitable for exterior applications.

2.2 PANEL SIGNS

- 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. Mayorgo Sign Shop
  2. Advance Corporation; Braille-Tac Division.
  3. Allenite Signs; Allen Marking Products, Inc.
  4. ASI-Modulex, Inc.
  5. Best Sign Systems Inc.
  6. Grimco, Inc.
  7. Innerface Sign Systems, Inc.
  8. Mohawk Sign Systems.
  9. Signature Signs, Incorporated.

- B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements.
  - 1. Finishes and Colors: As selected by Owner.
  - 2. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surface with contrasting colors (as required).
- C. Laminated Exterior Signs: Solid phenolic panel core with graphic image covered with thermosetting resin face layer.
  - 1. Surface Finish: UV resistant, outdoor.
  - 2. Finishes and Colors: As selected by Owner.

## 2.3 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

## 2.4 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
  - 1. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
  - 2. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
  - 3. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

## 2.5 FINISHES, GENERAL

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## 2.6 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Locate signs and accessories using mounting methods of types described and complying with manufacturer's written instructions.
  - 1. Install signs level, plumb, and at heights indicated and as required by ADA, with sign surfaces free of distortion and other defects in appearance.
  - 2. Interior Wall Signs: Install signs in locations as indicated by Owner and meeting Accessibility Requirements (ADA).
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
  - 1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
  - 2. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
  - 3. Mechanical Fasteners: Use non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

#### 3.2 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400



## SECTION 102113.17 – PLASTIC LAMINATE TOILET COMPARTMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Plastic Laminate compartments configured as toilet enclosures and urinal screens.

#### 1.2 ACTION SUBMITTALS

##### A. Product Data: For each type of product.

##### B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachment details.

##### C. Samples for each type of toilet compartment material indicated.

##### D. Color to be Wilsonart 4830K-18; Stainless

#### 1.3 INFORMATIONAL SUBMITTALS

##### A. Product certificates.

#### 1.4 CLOSEOUT SUBMITTALS

##### A. Maintenance data.

### 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. Flame-Spread Index: 200 or less.
2. Smoke-Developed Index: 450 or less.

##### 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 for toilet compartments designated as accessible.

## 2.2 PHENOLIC-CORE TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide one of the following:
  - 1. All American Metal Corp.
  - 2. Ampco Products, LLC.
  - 3. Bobrick Washroom Equipment, Inc.
  - 4. Bradley Corporation.
  - 5. Global Partitions; ASI Group.
  - 6. Knickerbocker Partition Corporation.
  - 7. Marlite.
- B. Toilet-Enclosure Style: Overhead braced and Floor anchored.
- C. Entrance-Screen Style: n/a
- D. Urinal-Screen Style: Wall hung.
- E. Door, Panel, Screen, and Pilaster Construction: Provide minimum 3/4-inch-thick doors and pilasters and minimum 1/2-inch thick panels.
- F. Pilaster Shoes and Sleeves Caps: Formed from stainless-steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.
- G. Urinal-Screen Post: Manufacturer's standard post design
- H. Brackets (Fittings):
  - 1. Stirrup Type: Ear or U-brackets, clear-anodized aluminum
- I. Phenolic-Panel Finish:
  - 1. Facing Sheet Finish: One color and pattern in each room.
  - 2. Color and Pattern: As selected by Owner from manufacturer's full range
  - 3. Edge Color: Manufacturer's standard

## 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
  - 1. Material: Clear-anodized aluminum
  - 2. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
- B. Hardware and Accessories: Manufacturer's heavy-duty stainless steel operating hardware and accessories.
  - 1. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

- C. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- D. 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 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. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.
- E. 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.
- F. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of posts. Provide shoes and sleeves caps at posts to conceal anchorage.
- G. Door Size and Swings: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 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: 1/2 inch
  - b. Panels and Walls: 1 inch
2. 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.
3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
  - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
  - b. Align brackets at pilasters with brackets at walls.

### 3.2 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 to return doors to fully closed position.

END OF SECTION 102113.17

## SECTION 102800 – TOILET AND BATH ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Public-use washroom accessories
  - 2. Private-use bathroom accessories
  - 3. Underlavatory guards; handicap designated.
- B. Product Data: For each type of product indicated.

#### 1.2 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### PART 2 - PRODUCTS

#### 2.1 PUBLIC-USE WASHROOM ACCESSORIES

- A. Manufacturers: See Architectural and Interior Design Drawings for Accessories for Public Restrooms. Provide specified item.

#### 2.2 PRIVATE-USE BATHROOM ACCESSORIES

- A. Manufacturers: See Architectural and Interior Design Drawings for Accessories for Private Restrooms. Provide specified item.

### 2.3 UNDERLAVATORY GUARDS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
  - 1. Bobrick Washroom Equipment, Inc.
  - 2. Plumberex Specialty Products, Inc.
  - 3. Truebro by IPS Corporation.
- B. Underlavatory Guard :
  - 1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
  - 2. Material and Finish: Antimicrobial, molded plastic, white.

### 2.4 FABRICATION

- A. 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.
- B. Install accessories meeting requirements of applicable accessibility codes as indicated in drawings.
- C. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

END OF SECTION 102800

## SECTION 10305 - PRE-FABRICATED FIREPLACES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SECTION INCLUDES

- A. Prefabricated propane gas fireplaces.

#### 1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard details and installation instructions.
- B. Operation and Maintenance Data: Deliver to Owner manufacturer's recommended printed operation and maintenance procedures.
- C. Submit installation shop drawings showing entire system installation based on actual building location.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inspect products upon receipt to ensure products are free from damage occurring in transit.
- B. Store products in covered area, well-protected from weather.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURER

- 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. Sparkfire Fireplaces: [www.sparkfire.com](http://www.sparkfire.com)
    - a. Style: LBS type 96" long, two sided propane fireplace.
    - b. Remote Control
    - c. Install with Flue, fan and mechanical damper from Exhausto.com
    - d. Glass Doors on both sides, only one side required to be open during operation. Provide permanent signage (location and design approved by Owner) indicating the requirement for one side of the glass to be open during operation.
    - e. Provide combustion air fresh air kit for outside air from underneath.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that dimensions are correct and substrate is in proper condition for installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install in strict accordance with manufacturer's instructions and approval listings.
- B. No deviations or modifications are acceptable.

3.3 ADJUST AND CLEAN

- A. Adjust components for proper operation.

END OF SECTION 10305



## SECTION 104413 - FIRE PROTECTION CABINETS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes fire-protection cabinets for portable fire extinguishers.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For fire-protection cabinets.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.4 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

#### 2.2 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
    - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
    - b. Larsens Manufacturing Company.

c. Potter Roemer LLC. Basis of Design

- B. Cabinet Construction: One-hour fire rated and Two-hour fire rated (if located in two hour rated wall construction).
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls lined with minimum 5/8-inch- thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Aluminum sheet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
  - 1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
- E. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim. Surface Mounted box only when mounted direct to Masonry wall.
- F. Cabinet Trim Material: Aluminum sheet
- G. Door Material: Aluminum sheet
- H. Door Style: Fully glazed panel with frame.
- I. Door Glazing: Acrylic sheet
  - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- K. 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. Handle: Flush Pull Handle.
  - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate [as indicated] [as directed by Architect] <Insert location>.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER".
      - 1) Location: Applied to cabinet glazing.
      - 2) Application Process: Pressure-sensitive vinyl letters.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.

L. Materials:

1. Aluminum: ASTM B 221 for extruded shapes and aluminum sheet, with strength and durability characteristics of not less than Alloy 6063-T5 for aluminum sheet.
  - a. Finish: Color anodic.
  - b. Color: As selected by Architect from full range of manufacturer colors and color densities.
2. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 6 mm thick, with Finish 1 smooth or polished.

2.3 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.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prepare recesses for recessed and semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.
- B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Identification: Apply vinyl lettering at locations indicated.
- E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

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 Sections:
  - 1. Division 10 Section "Fire Extinguisher Cabinets."
  - 2. Division 15 Section "Water-Based Fire-Suppression Systems" for hose systems, racks, and valves.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- C. Warranty: Sample of special warranty.

#### 1.4 QUALITY ASSURANCE

- 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 FMG.

#### 1.5 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

## 1.6 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.
    - b. Faulty operation of valves or release levers.
  - 2. Warranty Period: Six (6) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 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, but are not limited to, the following:
    - a. J. L. Industries, Inc.; a division of Activar Construction Products Group
    - b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - c. Larsen's Manufacturing Company.
    - d. Potter Roemer LLC. (Basis of Design)
    - e. Amerex Corporation.
  - 2. Valves: Manufacturer's standard.
  - 3. Handles and Levers: Manufacturer's standard.
  - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container:
  - 1. Units: UL-rated 2A:10-B:C, 5-lb (2.3-kg) nominal capacity.
  - 2. Common Areas: 4A:80-B:C, 10-lb (4.5-kg) nominal capacity.

### 2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

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.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

## SECTION 105500 - POSTAL SPECIALTIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. HUD and USPS-approved horizontal mail receptacles and parcel lockers.
2. HUD and USPS-approved collection boxes.
  - a. Letter drops.
  - b. Package depository.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of postal specialty.
- B. Shop Drawings: For postal specialties. Include plans, elevations, sections, details, and attachments to other work.
- C. Product certificates, including written approval by Postmaster General.
- D. Other Informational Submittals: Final USPS local postmaster approval for installed postal specialties to be served by USPS.
- E. Maintenance Data: Closeout submittal for postal specialties and finishes to include in maintenance manuals.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations for Each Type of Postal Specialty: For USPS-approved products, use only those included on current lists of USPS manufacturers and models.
- B. Requirements of Regulatory Agencies: Comply with U.S. Postal Service requirements for construction and installation of units.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver lock keys to Owner by registered mail or overnight package service with a record of each corresponding lock and key number.

## 1.5 COORDINATION

- A. Coordinate layout and installation of mail chutes and attachments to structure with other construction that passes above ceilings, penetrates ceilings, or is supported by them in the vicinity of mail chutes; including light fixtures, HVAC ductwork and equipment, fire-suppression system and other piping, and partition assemblies.
- B. Coordinate layout and installation of recessed postal specialties with wall construction.
- C. Templates: Obtain templates for installing postal specialties and distribute to parties involved.

## 1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of postal specialties that fail in materials or workmanship within five year from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Aluminum: Manufacturer's standard alloy and temper for type of use and finish indicated, and as follows:
  - 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
  - 2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
- B. Stainless-Steel Sheet: ASTM A 666, Type 304.
- C. Stainless-Steel Anchor Bolts, Nuts, and Washers: ASTM A 193/A 193M, Grade B8M, Type 316.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

### 2.2 USPS-APPROVED HORIZONTAL MAIL RECEPTACLES AND PARCEL LOCKERS

- A. Front-Loading, USPS-Approved Horizontal Mail Receptacles and Parcel Lockers as indicated and consisting of multiple compartments with fixed, solid compartment backs, enclosed within framed wall box. Provide access to compartments for distributing incoming mail from front of unit by unlocking master lock and swinging side-hinged master door to provide accessibility to entire group of compartments. Provide access to each compartment, including parcel lockers for removing mail and parcels by swinging compartment door. Comply with USPS-STD-4C adapted for larger-sized interior, parcel compartments and compliant with the requirements for multi-family development.



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. American Eagle Mailboxes.
    - b. American Postal Manufacturing Co.; Division of Postal Products Unlimited, Inc.
    - c. Auth-Florence Manufacturing; a Florence company.
    - d. Bommer Industries, Inc.
    - e. Jensen Industries.
    - f. Security Manufacturing Corporation.
    - g. AF Florence Manufacturing Company (Basis of Design)
  2. 4C Horizontal Mailbox, 6 door high, Double Column, 10 Tenant Mail Doors / Front Loading – USPS Access, 4CADD-10
  3. Mail Delivery: USPS
  4. Compartments: Number and size as indicated on Drawings.
  5. Front-Loading Master Door: Fabricated from extruded aluminum and braced and framed to hold compartment doors; prepared to receive master-door lock provided, by local postmaster.
  6. Compartment Doors: Fabricated from extruded aluminum. Equip each with lock and tenant identification as required by cited standard. Provide mail slot in the compartment with master-door lock.
    - a. Compartment-Door Locks: Comply with USPS-L-1172C, PSIN O910, for locks and keys, or equivalent as approved by USPS; with three keys for each compartment door. Key each compartment differently.
  7. Frames: Fabricated from extruded aluminum or aluminum sheet; ganged and nested units, with cardholder and blank cards for tenant's identification within each compartment.
  8. Snap-on Trim: Fabricated from same material and finish as compartment doors.
  9. Concealed Components and Mounting Frames: Aluminum or steel sheet with manufacturer's standard finish.
  10. Exposed Aluminum Finish: Finish surfaces exposed to view as follows:
    - a. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
  11. Numbering: ALL GROUND LEVEL RESIDENTIAL APARTMENT MAILBOXES MUST BE LOCATED WITHIN 15" and 48" OF FINISHED FLOOR. PROVIDE MAIL BOX NUMBERING SYSTEM ON SHOP DRAWINGS INDICATING UNIT DESIGNATIONS.
- 2.3 USPS-APPROVED COLLECTION BOXES-If indicated in mail area elevations.
- A. USPS-Approved, Front-Loading Collection Boxes as indicated and consisting of single compartment with fire-resistant cushion bottom, enclosed within wall box, with mail slot to receive mail. Provide access to compartment for collecting mail from front of unit. Comply with USPS Publication 16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. American Eagle Mailboxes.
  - b. American Postal Manufacturing Co.; Division of Postal Products Unlimited, Inc.
  - c. Auth-Florence Manufacturing; a Florence company.
  - d. Bommer Industries, Inc.
  - e. Jensen Industries.
  - f. Security Manufacturing Corporation.
  - g. AF Florence Manufacturing Company (Basis of Design)
2. Letter Box, Standard, Recessed Mounted- USPS Access,
3. Mounting: Recessed
4. Height: Sized to match height of four horizontal mail receptacles.
5. Compartment Door and Frame: Fabricated from minimum 1/8-inch- thick aluminum, with opening not less than 12 by 20 inches and not more than 18 by 30 inches (457 by 762 mm). Equip door with lock and concealed, full-length, flush hinge on one side.
  - a. Door Lock: Door prepared to receive lock provided by local postmaster.
  - b. Identification: Engrave face of compartment door with 1-inch- (25-mm-) high letters as follows: "U.S. MAIL LETTER BOX" on two lines at top or bottom of unit.
  - c. Door Style: Set door within face frame.
6. Mail Slot: Fabricated from 1/4-inch- thick aluminum, with 11-inch-wide by 3/4-inch-high opening, protected by inside hood and hinge flap, and with inside baffle to prevent removal of mail from box.
7. Exposed Materials: Fabricated from extruded or sheet aluminum.
8. Concealed Components and Mounting Frames: Aluminum or steel sheet with manufacturer's standard finish.

## 2.4 FABRICATION

- A. Form postal specialties to required shapes and sizes, with true lines and angles, square, rigid, and without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges and corners free of sharp edges and burrs and safe to touch. Fabricate doors of postal specialties to preclude binding, warping, or misalignment.
- B. Preassemble postal specialties in shop to greatest extent possible to minimize field assembly.
- C. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to exclude water penetration.
- D. Fabricate tubular and channel frame assemblies with manufacturer's standard welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support loads.

## 2.5 GENERAL FINISH REQUIREMENTS

- 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.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install postal specialties level and plumb, according to manufacturer's written instructions and roughing-in drawings. See Plans for layout.
  - 1. Where dissimilar metals will be in permanent contact with each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other permanent separation as recommended by manufacturer for this purpose.
  - 2. Where aluminum will contact grout, concrete, masonry, or wood, protect against corrosion by painting contact surfaces with bituminous coating.
  - 3. Final acceptance of postal specialties served by USPS depends on compliance with USPS requirements.
- B. Horizontal Mail Receptacles: Install horizontal mail receptacles with center of tenant-door lock cylinders and bottom of compartments at the maximum and minimum heights above finished floor established by USPS and manufacturer's written instructions.
  - 1. Install removable-core and keyed-in door lock cylinders as required for each type of cylinder lock.
  - 2. Install and align two rack ladders for the first column of mail receptacles and one rack ladder for each additional adjacent column of mail receptacles.
- C. Collection Boxes: Install collection boxes with centerline of mail slots more than 48 inches above finished floor.

### 3.2 FIELD QUALITY CONTROL

- A. Arrange for USPS personnel to examine and test postal specialties served by USPS after they have been installed according to USPS regulations.
- B. Obtain written final approval of postal specialties to be served by USPS. Obtain this approval from USPS postmaster that authorizes mail collection for the served installation.

### 3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Remove temporary protective coverings, as postal specialties are installed.

- B. Adjust and lubricate doors, hardware, and moving parts to function smoothly.
- C. Touch up marred finishes or replace postal specialties that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by postal specialty manufacturer.

END OF SECTION 105500

## SECTION 105610 - CLOSET 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. This section includes vinyl coated wire shelving and steel coat rod produced by single manufacturer for entire project.
  - 1. Closet shelving shall be vinyl coated wire shelving, unless noted otherwise.

#### 1.3 SUBMITTALS

- A. Product data for each type of product specified.
- B. WARRANTY: Provide manufacturer's written 10 year warranty against any 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, but are not limited to, the following:
  - 1. ClosetMaid
  - 2. Rubbermaid

#### 2.2 PRODUCTS

- A. MATERIALS:
  - 1. Provide in sizes as required for application indicated on the drawings. All Shelving including clothes shelves shall be adjustable in height.
  - 2. Clothes Closets: provide ventilated shelves with optional clothes rod clips and clothes rods.
  - 3. Linen Closets: Provide with ventilated shelves.
- B. FINISH: Color: White
- C. COATING: Baked on white epoxy coating

- D. **LOAD CAPACITY:** Shelves shall withstand a static load of 75 pounds per square foot. Installed as per manufacturers specification with screws penetrating solid metal/wood backing.
- E. It is not acceptable to fasten/secure shelving/accessories into gypsum wallboard only.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. **GENERAL:** Comply with manufacturer's instructions and recommendations.
- B. **MOUNTING HARDWARE:** Components shall provide for shelving installations to drywall without requiring mounting to concealed wall structure members.

Support brackets shall be made of .065 inch grade 1008 heavy duty Steel with non-stick epoxy coating. They shall be used so that spans do not exceed 30" on the shelf-closet/rod and 4'-0" on shelf-storage/linen.

END OF SECTION 105610

## SECTION 113100 - RESIDENTIAL APPLIANCES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Residential appliances.
  - 2. Amenity and Maintenance area appliances.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product certificates.
- C. Warranties: Sample of special warranties.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

#### 1.4 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: One year from date of date of Substantial Completion.

### PART 2 - PRODUCTS

2.1 Appliances will be Owner selected. The Owner will make the final color selection. Coordinate product install and electrical requirements.

- A. Manufacturers: Subject to Owner approval of the proposal from the manufacturer on this project, the manufacturers that will be considered are:
  - 1. General Electric Company (GE).
  - 2. Whirlpool
  - 3. Kenmore.

2.2 RANGES

- A. Energy Star Rated; Freestanding range with one oven.
  - 1. Location: All units
  - 2. Color: As selected by Owner and Interior Designer.

2.3 MICROWAVE OVENS

- A. Microwave Oven with recirculating fan Energy Star Rated; Over the Range mounted with recirculating venting system.
  - 1. Location; All units except for Units that have counter microwave.
  - 2. Color: As selected by Owner and Interior Designer.

2.4 REFRIGERATOR/FREEZERS

- A. Refrigerator/Freezers: must be ENERGY STAR qualified
- B. Refrigerator/Freezer
  - 1. Ice Maker: Included
  - 2. Location: All units
  - 3. Color: As selected by Owner and Interior Designer.

2.5 UNDERCOUNTER REFRIGERATOR

- A. Undercounter Refrigerator: Must be ENERGY STAR qualified
  - 1. At clubroom
  - 2. Color: As selected by Owner and Interior Designer.

2.6 DISHWASHERS

Dishwasher; must be ENERGY STAR qualified

- 1. Location: All units and Clubhouse (common area dishwashers will require heat element booster to raise water washing temperature to Commercial standard, which will require a dishwasher rated for the increased temperature).
- 2. Color: As selected by Owner and Interior Designer.
- B. Coordinate pig-tail or plug end electrical requirements with field conditions prior to purchase.

2.7 WASTE DISPOSAL UNITS

- A. Waste Disposal Unit –
  - 1. Reference Product: 1/3 HP Continuous Feed Corded.
  - 2. Location: All residential dwelling units and Clubroom installed at Kitchen Sink



## 2.8 CLOTHES WASHERS AND DRYERS

- A. Clothes Washer side by side– ENERGY STAR qualified.
  - 1. Location: as noted on plans
  - 2. Color: As selected by Owner and Interior Designer.
- B. Clothes Dryer side by side
  - 1. Location: As noted on plans.
  - 2. Color: As selected by Owner and Interior Designer.
- C. Stacked full size Washer Dryer Combo
  - 1. Location: As noted on plans.
  - 2. Color: As selected by Owner and Interior Designer.

## 2.9 RANGE HOOD EXHAUST FAN-Energy Star Rated.

- A. Location: See Plans.
  - 1. Color: As selected by Owner and Interior Designer.
  - 2. Provide with separate Fan and light control switches. Switches to be wall mounted on raised backsplash (not on back wall).

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Contractor is responsible for scheduling delivery, receiving, placing and installing all appliances, whether Contractor or Owner provided. Any damage to appliances is the responsibility of the Contractor.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.
- E. Utilities: Comply with plumbing and electrical requirements.
- F. Adjust all appliances for level.
- G. Note: Clothes Dryers must comply with the manufacturer's recommendation for length of dryer vent run. See mechanical specifications for more information.

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END OF SECTION 113100

## SECTION 122113 - HORIZONTAL LOUVER BLINDS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Horizontal louver blinds with polymer slats on all horizontal sliding windows with wand type operation.

#### 1.2 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

#### 1.3 CLOSEOUT SUBMITTALS

- ##### A. Maintenance data.

#### 1.4 QUALITY ASSURANCE

- ##### A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 HORIZONTAL LOUVER BLINDS

- ##### A. Manufacturers: As selected by Owner.

- ##### B. Polymer Slats: Lead free, UV stabilized.

1. Width: 2 inches.
2. Profile: Manufacturer's standard.
3. Flame-Resistance Rating: Comply with NFPA 701; testing by a qualified
4. Wand type operating devices

- C. Colors, Textures, Patterns, and Gloss:
  - 1. Slats: White smooth finish

## 2.2 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for wand operating devices; lead free content of components; and warning labels.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
  - 1. Locate so exterior slat edges are not closer than 1 inch from interior faces of glass and not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.
  - 2. Install mounting and intermediate brackets to prevent deflection of headrails.
  - 3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.
- C. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.
- D. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

END OF SECTION 122113

## SECTION 123530 - RESIDENTIAL CASEWORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes kitchen and vanity cabinets.
  - 1. Door Style: Solid wood, style as selected by Interior Designer/Owner.
  - 2. Cabinet Body: As selected by Owner and Interior Designer.
  - 3. See Section 123640 Stone Countertops for Countertops.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
- C. Shop Drawings: For residential casework. Include plans, elevations, details, and attachments to other work.
- D. Samples: For casework and hardware finishes.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For casework.

### PART 2 - PRODUCTS

#### 2.1 CABINETS

- A. Manufacturer: As selected by Owner and Interior Designer.
- B. Quality Standard: Provide cabinets that comply with KCMA A161.1.
- C. Door and Drawer Face Style:
  - 1. Door: As selected by Interior Designer / Owner
  - 2. Finish: As selected by Interior Designer / Owner
  - 3. Door and Drawer Fronts: As selected by Interior Designer / Owner
- D. Cabinet Style: As selected by Interior Designer / Owner
- E. Exposed Cabinet End Finish: Nominal 1/2" plywood, finished on two sides.

## 2.2 CABINET MATERIALS

- A. Hardwood Lumber: Kiln dried to 7 percent moisture content.
- B. Softwood Lumber: Kiln dried to 10 percent moisture content.
- C. Composite Wood Products: Products shall be made without urea formaldehyde.
- D. Particleboard: ANSI A208.1, Grade M-2.
- E. MDF: Medium-density fiberboard, ANSI A208.2, Grade MD.
- F. Hardboard: ANSI A135.4, Class 1 tempered.
- G. Adhesives: Do not use adhesives that contain urea formaldehyde. Use low VOC adhesives.
- H. Exposed Materials:
  - 1. Finish: As selected by Interior Designer/Owner from manufacturer's full range.
- I. Semi-exposed Materials: Unless otherwise indicated, provide the following:
  - 1. Vinyl-Faced Particleboard: MDF with embossed, wood-grain-patterned vinyl film adhesively bonded to particleboard.
    - a. Provide vinyl film on both sides of shelves, dividers, drawer bodies, and other components with two semi-exposed surfaces and on semi-exposed edges.
    - b. Colors, Textures, and Patterns: As selected by Architect from cabinet manufacturer's full range.
- J. Concealed Materials: Solid wood or plywood, of any hardwood or softwood species, with no defects affecting strength or utility.
- K. Stone Countertop supports: ¾" Plywood to support non-structural stone tops.

## 2.3 CABINET HARDWARE

- A. General: Manufacturer's standard units complying with BHMA A156.9, of type, size, style, material, and finish as selected by Interior Designer/Owner from manufacturer's full range.
- B. Pulls: Type, Color and finish to be selected by Interior Designer/Owner.
- C. Hinges: ½ overlay 110 degree opening concealed hinges.
- D. Drawer Guides: Epoxy-coated-metal, self-closing drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05011 or Type B05091.
- E. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
  - 1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.

2. Drawers: Provide one bumper on back side of drawer front at each corner.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install casework with no variations in adjoining surfaces; use concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework.
- B. Install casework without distortion so doors and drawers fit the openings, are aligned, and are uniformly spaced. Complete installation of hardware and accessories as indicated.
- C. Install casework level and plumb to a tolerance of 1/8 inch in 8 feet.
- D. Fasten casework to adjacent units and to backing.
  1. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. into wall studs.
    - a. Fasteners: No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing or structural blocking.
- E. Adjust hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- F. Clean casework on exposed and semi-exposed surfaces. Touch up as required to restore damaged or soiled areas to match original factory finish, as approved by Interior Designer.

END OF SECTION 123530

## SECTION 123623 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes plastic-laminate countertops.

#### 1.2 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.
- C. Samples:
  - 1. Plastic laminates, for each color, pattern, and surface finish.

### PART 2 - PRODUCTS

#### 2.1 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.
- B. Grade: Premium.
- C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.
  - 1. Manufacturers: See Interior Design Drawings for manufacturer, color and patterns.
- 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 Interior Designer.
- E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- F. Core Material at Sinks: medium-density fiberboard made with exterior glue.
- G. 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.



## 2.2 MISCELLANEOUS MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.

## 2.3 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
  - 1. Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
- B. 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.
- C. 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.

### 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.
  - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required.
  - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Install countertops 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.

- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 2. Secure backsplashes to walls with adhesive.
  - 3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

END OF SECTION 123623

## SECTION 123640 - STONE COUNTERTOPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes stone countertops.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Samples: Provide 4" x 4" sample of each color

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of stone countertops.

#### 1.4 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of construction to receive stone countertops by field measurements before fabrication.

### PART 2 - PRODUCTS

#### 2.1 GRANITE

- A. Granite: Comply with ASTM C 615.
- B. Description: Uniform, medium-grained, stone without veining.
- C. Variety and Source: Subject to compliance with requirements, provide the following:
  - 1. Stone products shall be provided from one source.
- D. Cut stone from contiguous, matched slabs in which natural markings occur.
- E. Finish: Polished.
- F. Selection to be made by Owner or Interior Designer.

## 2.2 ADHESIVES, GROUT, SEALANTS, AND STONE ACCESSORIES

- A. General: Use only adhesives formulated for stone and ceramic tile and recommended by their manufacturer for the application indicated.
- B. Water-Cleanable Epoxy Adhesive: ANSI A118, with a VOC content of 65 g/L or less.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bonsal, W. R. Company.
    - b. Bonstone Materials Corporation.
    - c. C-Cure.
    - d. Custom Building Products.
    - e. Laticrete International, Inc.
    - f. MAPEI Corp.
    - g. Summitville Tiles, Inc.
- C. Stone Adhesive: Two-part epoxy or polyester adhesive, formulated specifically for bonding stone to stone, with an initial set time of not more than two hours at 70 deg F (21 deg C), and with a VOC content of 65 g/L or less.
  - 1. Color: Clear
  - 2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Epoxy Adhesive: Akemi North America; Akepox.
    - b. Epoxy Adhesive: Axson North America, Inc., Wood & Stone Company; Akabond Epoxy.
    - c. Epoxy Adhesive: Bonstone Materials Corporation; Touchstone Ratio Pac Clear Gel Epoxy.
    - d. Epoxy Adhesive: Bonstone Materials Corporation; Touchstone Last Patch.
    - e. Polyester Adhesive: Akemi North America; Platinum Clear Polyester Adhesive.
    - f. Polyester Adhesive: Axson North America, Inc., Wood & Stone Company; Wood & Stone Polyester.
    - g. Polyester Adhesive: Bonstone Materials Corporation; Gripstone L-200KG.
- D. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Division 07 Section "Joint Sealants" and will not stain the stone it is applied to.
- E. Stone Cleaner: Cleaner specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer and, if a sealer is specified, by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- F. 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.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, but not limited to:
    - a. Bostik Findley Inc.

- b. Custom Building Products.
- c. Hillyard, Inc.
- d. HMK Stone Care System.
- e. Miracle Sealants Company.
- f. Stone Care International Inc.
- g. Summitville Tiles, Inc.

## 2.3 STONE FABRICATION

- A. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
- B. Fabricate stone countertops in sizes and shapes required to comply with requirements indicated.
  1. Dress joints straight and at right angle to face unless otherwise indicated.
  2. Fabricate molded edges with machines having abrasive shaping wheels made to reverse contour of edge profile to produce uniform shape throughout entire length of edge and with precisely formed arris slightly eased to prevent snipping, and matched at joints between units. Form corners of molded edges as indicated with outside corners slightly eased unless otherwise indicated.
  3. Finish exposed faces of stone to comply with requirements indicated for finish of each stone type required and to match approved Samples and mockups. Provide matching finish on exposed edges of countertops, splashes, and cutouts.
- C. General: Comply with recommendations in MIA's "Dimension Stone - Design Manual VI."
- D. Nominal Thickness: Provide thickness indicated, but not less than 2cm . Gage backs to provide units of identical thickness.
- E. Splashes: Provide 3/4-inch thick 4" high minimum backsplashes and end splashes unless otherwise indicated.
- F. Joints: Fabricate countertops without joints.
- G. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated and 1/16 inch in width.
- H. Cutouts and Holes:
  1. Under-counter Fixtures: Make cutouts for under-counter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
  2. Counter-Mounted 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.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION OF COUNTERTOPS

- A. General: Install countertops over plywood sub-tops with full spread of water-cleanable epoxy adhesive.
- B. General: Install countertops by adhering to supports with water-cleanable epoxy adhesive.
- C. Set stone to comply with requirements indicated. Shim and adjust stone to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships
- D. Space joints with 1/16-inch gap for filling with sealant. Use temporary shims to ensure uniform spacing.
  - 1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Use power saws with diamond blades to cut stone. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- F. Install backsplashes and end splashes by adhering to wall with water-cleanable epoxy adhesive. Leave 1/16-inch gap between countertop and splashes for filling with sealant. Use temporary shims to ensure uniform spacing.
- G. Grout joints to comply with ANSI A108.10. Remove temporary shims before grouting. Tool grout uniformly and smoothly with plastic tool.
- H. Apply sealant to joints and gaps; comply with Section 079200 "Joint Sealants." Remove temporary shims before applying sealant.

#### 3.2 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
- B. Clean stone countertops no fewer than six days after completion of sealant installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.
- C. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions.

END OF SECTION 123640

## SECTION 142400 - HYDRAULIC ELEVATOR

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes hydraulic passenger elevator.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and large-scale details indicating service at each landing; machine room layout; coordination with building structure; relationships with other construction; and locations of equipment.
  - 2. Indicate maximum dynamic and static loads imposed on building structure at points of support as well as maximum and average power demands.
- C. Samples: For finishes involving color selection.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Signed by elevator manufacturer, certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.5 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
  - 1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 HYDRAULIC ELEVATOR MANUFACTURERS

- 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. KONE Inc.
  - 2. Mowrey Elevator Co. (Basis of Design)
  - 3. Otis Elevator Co.
  - 4. Schindler Elevator Corp.
  - 5. ThyssenKrupp Elevator.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description:
  - 1. Elevator Number: 1
  - 2. Type: Under-the-car single cylinder.
  - 3. Rated Load: 2500 lb.
  - 4. Rated Speed: 100 fpm.
  - 5. Operation System: Single automatic operation
  - 6. Auxiliary Operations:
    - a. Battery-powered lowering.
    - b. Nuisance call cancel.
    - c. Automatic operation of lights and ventilation fans.
  - 7. Car Enclosures:



- a. Inside Width: Not less than 80 inches from side wall to side wall.
  - b. Inside Depth: Not less than 51 inches from back wall to front wall (return panels).
  - c. Inside Height: Not less than 96 inches to underside of ceiling. Cab Height 102” Min.
  - d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.
  - e. Car Fixtures: Satin stainless steel, No. 4 finish.
  - f. Side and Rear Wall Panels: Plastic laminate.
  - g. Door Faces (Interior): Plastic Laminate.
  - h. Ceiling: Satin stainless steel, No. 4 finish with 6 down lights.
  - i. Handrails: Flat Bar rectangular satin stainless steel, No. 4 finish at sides and rear of car.
  - j. Floor prepared to receive LVT flooring (see ID Drawings for Flooring specification)
8. Hoistway Entrances:
- a. Width: 42 inches.
  - b. Height: 84 inches.
  - c. Type: Single-speed side sliding.
  - d. Frames: Satin stainless steel, No. 4 finish.
  - e. Doors: Satin stainless steel, No. 4 finish.
9. Hall Fixtures: Satin stainless steel, No. 4 finish.
10. Additional Requirements:
- a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
  - b. Provide hooks for protective pads in and one complete set of full-height protective pads.

## 2.4 SYSTEMS AND COMPONENTS

- A. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.
  1. Pump shall be submersible type with submersible squirrel-cage induction motor, and shall be suspended inside oil tank from vibration isolation mounts
  2. Motor shall have solid-state starting.
  3. Motor shall have variable-voltage, variable-frequency control.
- B. Hydraulic Silencers: System shall have hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- C. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.

- D. Hydraulic Fluid: Nontoxic, biodegradable, fire-resistant fluid, made from vegetable oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives, that is approved by elevator manufacturer for use with elevator equipment.
  - 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. Hydro Safe Oil Division, Inc.
- E. Protective Cylinder Casing: PVC or HDPE pipe casing complying with ASME A17.1/CSA B44, of sufficient size to provide not less than 1-inch clearance from cylinder and extending above pit floor. Casing shall have means of monitoring effectiveness to comply with ASME A17.1/CSA B44.
- F. Guides: Roller guides, Polymer-coated, nonlubricated sliding guides or sliding guides with guide-rail lubricators. Provide guides at top and bottom of car frame.

## 2.5 OPERATION SYSTEMS

- A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
- B. Auxiliary Operations:
  - 1. Single-Car Standby-Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at main lobby. Manual operation causes automatic operation to cease.
  - 2. Single-Car Battery-Powered Lowering: When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
  - 3. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after 5 minutes and are re-energized before car doors open.

## 2.6 DOOR-REOPENING DEVICES

- A. Infrared Array: Provide door-reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door-reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

## 2.7 CAR ENCLOSURES

- A. General: Provide enameled- or powder-coated-steel car enclosures to receive removable wall panels, with removable car roof, access doors, power door operators, and ventilation.
1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
1. Enameled- or Powder-Coated-Steel Wall Panels: Flush, formed-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel or powder-coat finish; colors as selected by Architect from manufacturer's full range.
  2. Stainless-Steel Wall Panels: Flush, formed-metal construction; fabricated from stainless-steel sheet.
  3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to manufacturer's standard formed metal panels with manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E84. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
  4. Plastic-Laminate Doors: Flush, hollow-metal construction; fabricated by laminating plastic laminate to exposed faces of enameled- or powder-coated-steel doors and covering edges with protective edge trim matching return panels. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
  5. Sight Guards: Provide sight guards on car doors.
  6. Sills: Extruded or machined metal, with grooved surface, 1/4 inch thick.
  7. Metal Ceiling: Flush panels, with LED downlights
  8. Light Fixture Efficiency: Not less than 35 lumens/W.
  9. Ventilation Fan Efficiency: Not less than 3.0 cfm/W.

## 2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door-and-frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252.
1. Fire-Protection Rating: 1 hour with 30-minute temperature rise of 450 deg F.
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
1. Stainless-Steel Frames: Formed from stainless-steel sheet.

2. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 inches high, on both jambs of hoistway door frames.
3. Plastic-Laminate Doors: Flush, hollow-metal construction; fabricated by laminating plastic laminate to exposed faces of enameled- or powder-coated-steel doors and covering edges with protective edge trim matching door frames. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
4. Sight Guards: Provide sight guards on doors matching door edges.
5. Sills: Extruded or machined metal, with grooved surface, 1/4 inch thick.
6. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

## 2.9 SIGNAL EQUIPMENT

- A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal-resistant buttons and lighted elements illuminated with LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
  1. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet and telephone jack in each car and required conductors in traveling cable for firefighters' two-way telephone communication service.
- E. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- F. Hall Push-Button Stations: Provide hall push-button station at each landing as indicated.
- G. Hall Lanterns: Units with illuminated arrows; however, provide single arrow at terminal landings.
  1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
  2. Manufacturers standard Units mounted in both jambs of entrance frame.
- H. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

- I. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

## 2.10 FINISH MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.
- C. Stainless-Steel Sheet: ASTM A240/A240M, Type 304.
- D. Stainless-Steel Bars: ASTM A276, Type 304.
- E. Stainless-Steel Tubing: ASTM A554, Grade MT 304.
- F. Aluminum Extrusions: ASTM B221, Alloy 6063.
- G. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS or Type HGL.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Excavation for Cylinder: Drill well hole in elevator pit to accommodate installation of cylinder; comply with applicable requirements in Section 312000 "Earth Moving."
- B. Provide waterproof well casing as necessary to retain well-hole walls.
- C. Install cylinder in protective casing within well hole. Before installing protective casing, remove water and debris from well hole and provide permanent waterproof seal at bottom of well casing.
  1. Align cylinder and fill space around protective casing with fine sand. Confirm with local elevator inspector if they require the well casing with annular space to be left empty or will allow fill.
- D. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between protective casing and pit floor with 4 inches of nonshrink, nonmetallic grout.
- E. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- F. Lubricate operating parts of systems as recommended by manufacturers.

- G. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.
- H. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- I. Locate hall signal equipment for elevators as follows unless otherwise indicated:
  - 1. Place hall lanterns either above or beside each hoistway entrance.
  - 2. Mount hall lanterns at a minimum of 72 inches above finished floor.

### 3.2 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

### 3.3 PROTECTION

- A. Temporary Use: Comply with the following requirements for elevator used for construction purposes:
  - 1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
  - 2. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
  - 3. Engage elevator Installer to provide full maintenance service.
  - 4. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

### 3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator.

### 3.5 MAINTENANCE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

END OF SECTION 142400

## SECTION 210500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

##### A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: D.
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: [II].
  - a. Component Importance Factor: 1.
  - b. Component Response Modification Factor: *See Table 13.6-1 ASCE7-05*
  - c. Component Amplification Factor: *See Table 13.6-1 ASCE7-05*
3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 20% gravity.
4. Design Spectral Response Acceleration at 1-Second Period: 7% gravity.

#### 2.2 SLEEVES

- A. Mechanical Sleeve Seals: Modular rubber sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Galvanized-Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- D. PVC Pipe: ASTM D 1785, Schedule 40.

#### 2.3 ESCUTCHEONS & FLOOR PLATES

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

- B. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.
- C. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed or exposed-rivet hinge, and spring-clip fasteners.
- D. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- E. Split-Casting Floor Plates: Cast brass with concealed hinge.

#### 2.4 GROUT

- A. Description: ASTM C 1107, Grade B, non shrink and nonmetallic, dry hydraulic-cement grout.

#### 2.5 SEISMIC-RESTRAINT DEVICES

- A. Channel Support System: MFMA-4, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- B. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face and matched to type and size of attachment devices used.
- C. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
  - 1. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

### PART 3 - EXECUTION

#### 3.1 GENERAL PIPING INSTALLATIONS

- A. Install piping free of sags and bends.
- B. Install fittings for changes in direction and branch connections.
- C. Sleeves:
  - 1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.



2. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
3. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

D. Escutcheons & Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.
4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

E. Install unions at final connection to each piece of equipment.

3.2 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Piping Restraints:

1. Comply with requirements in MSS SP-127 and NFPA 13.

B. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

C. Install bushing assemblies for anchor bolts, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

D. Install bushing assemblies for mounting bolts, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

E. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

F. Drilled-in Anchors:

1. Do not damage existing reinforcing or embedded items during coring or drilling.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications

VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

END OF SECTION 210500

## SECTION 211000 - WATER-BASED FIRE-SUPPRESSION SYSTEMS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data for valves, sprinklers, specialties, and alarms.
2. Submit sprinkler system drawings identified as "working plans" and calculations according to NFPA 13, NFPA-13R, and NFPA-24. Submit required number of sets to authorities having jurisdiction for review, comment, and approval. Include system hydraulic calculations.
3. Submit test reports and certificates as described in NFPA 13, NFPA-13R, and NFPA-24.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Design and Installation Approval: Acceptable to authorities having jurisdiction.
- B. Hydraulically design sprinkler systems according to NFPA 13.
- C. Comply with NFPA 13 NFPA 13R and NFPA 70.
- D. UL-listed and -labeled and FM-approved pipe and fittings.

#### 2.2 PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795.
- B. Copper Tube: ASTM B 88, Type L or M; drawn temper.
- C. CPVC Plastic Pipe: ASTM F 442/F 442M, UL 1821, 175-psig rating, made in NPS for sprinkler service. Include "Listed" and "CPVC Sprinkler Pipe" marks on pipe.
- D. Cast-Iron Threaded Flanges: ASME B16.1, Class 250, raised ground face, bolt holes spot faced.
- E. Cast-Iron Threaded Fittings: ASME B16.4, Class 250, standard pattern.
- F. Grooved-End Fittings: UL-listed and FM-approved, ASTM A 536, Grade 65-45-12 ductile iron or ASTM A 47 Grade 32510 malleable iron, with grooves or shoulders designed to accept grooved couplings.

- G. Grooved-End Couplings: UL 213, ASTM A 536 ductile-iron or ASTM A 47 malleable-iron housing, with enamel finish. Include gaskets, bolts, and accessories.
- H. Wrought-Copper Fittings: ASME B16.22, streamlined pattern.
- I. Steel Press-Seal Fittings: UL 213, FM approved, 175-psig pressure rating, for use with Schedule 5, plain-end, steel pipe and fittings; with butylene O-rings, and pipe stop.
- J. CPVC Plastic Pipe Fittings: ASTM F 438 for NPS 3/4 to NPS 1-1/2 and ASTM F 439 for NPS 2, UL listed, 175-psig rating, for sprinkler service. Include "Listed" and "CPVC Sprinkler Fitting" marks on fittings.
- K. Provide hangers, supports, and seismic restraints with UL listing and FM approval for fire-protection systems.

## 2.3 VALVES

- A. Fire-Protection Service Valves: UL listed and FM approved, with 175-psig non shock minimum working-pressure rating. Indicating valves shall be butterfly or ball type, bronze body, and integral indicating device with visual 115-V ac, electric, two-circuit supervisory switch] indicator.
- B. Gate Valves: UL 262, cast bronze, solid wedge, outside screw and yoke, rising stem.
- C. Swing Check Valves, NPS 2 and Smaller: UL 312 or MSS SP-80, Class 150; bronze body with bronze disc.
- D. Swing Check Valves, NPS 2-1/2 and Larger: UL 312, cast-iron body and bolted cap, with bronze disc or cast-iron disc with bronze-disc ring.
- E. Alarm Check Valves: UL 193, 175-psig working pressure, designed for horizontal or vertical installation, with cast-iron, bronze grooved seat with O-ring seals, and single-hinge pin and latch design. Include trim sets for bypass, drain, electric sprinkler alarm switch, pressure gages, retarding chamber, fill-line attachment with strainer, and drip cup assembly.
- F. Ball Drip Valves: UL 1726, automatic drain valve, NPS 3/4, ball check device.

## 2.4 SPRINKLERS

- A. Automatic Sprinklers: With heat-responsive element complying with the following:
  - 1. UL 199, for applications except residential.
  - 2. UL 1626, for residential applications.
  - 3. UL 1767, for early-suppression, fast-response applications.
- B. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

- C. Sprinkler types include the following:
  - 1. Upright, pendent, and sidewall sprinklers.
  - 2. Extended coverage sprinklers.
  - 3. Quick-response sprinklers.
  - 4. Pendent and sidewall, dry-type sprinklers.
- D. Sprinkler Finishes: White enamel and bronze.
- E. Sprinkler Escutcheons White enamel steel, one piece, semi recessed; with finish to match sprinklers.
- F. Sprinkler Guards: Wire-cage type, including fastening device.
- G. Sprinkler Cabinets: Finished steel cabinet and hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench, suitable for wall mounting. Include number of sprinklers required by NFPA 13 and one wrench for sprinklers. Include separate cabinet with sprinklers and wrench for each style sprinkler on Project.

## 2.5 PIPING SPECIALTIES AND ALARM DEVICES

- A. Fire Department Connection: UL 405, flush, [wall] [yard] type, with cast-brass body; NH-standard thread inlets matching local fire department threads.
  - 1. Finish: Rough brass finish.
- B. Water-Motor-Operated Alarms: UL 753, mechanical-operation type with pelton-wheel operator with shaft length, bearings, and sleeve to suit wall construction and 10-inch- diameter, cast-aluminum alarm gong with red-enamel factory finish. Include NPS 3/4 inlet and NPS 1 drain connections.
- C. Water-Flow Indicators: UL 346; electrical-supervision, vane-type water-flow detector; with 250-psig pressure rating; and designed for horizontal or vertical installation. Include two single-pole, double-throw, circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
- D. Pressure Switches: UL 753; electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.
- E. Valve Supervisory Switches: UL 753; electrical; single-pole, double throw; with normally closed contacts. Include design that signals controlled valve is in other than fully open position.
- F. Pressure Gages: UL 393, 3-1/2- to 4-1/2-inch- diameter dial with dial range of 0 to 250 psig.

### PART 3 - EXECUTION

#### 3.1 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling

#### 3.2 SERVICE-ENTRANCE PIPING

- A. Water-Main Connection: Arrange with water utility company for tap of size and in location indicated in water main.
- B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
- C. Connect sprinkler piping to water-service piping for service entrance to building.
- D. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping
- E. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

#### 3.3 PIPING INSTALLATION

- A. Install "Inspector's Test Connections" in sprinkler piping, complete with shutoff valve.
- B. Install sprinkler zone control valves, test assemblies, and drain headers adjacent to standpipes.
- C. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.
- D. Install alarm devices in piping systems and connect to fire-alarm system.
- E. Protect piping from earthquake damage as required by NFPA 13.
- F. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Install gages to permit removal, and install where they will not be subject to freezing.
- G. Install fire-protection service valves supervised-open, located to control sources of water supply except from fire department connections. Where there is more than one control valve, provide permanently marked identification signs indicating portion of system controlled by each valve.
- H. Install check valve in each water supply connection. Install backflow preventers in potable-water supply sources.
- I. Install alarm check valves for proper direction of flow, including bypass check valve and retard chamber drain line connection.

### 3.4 SPRINKLER SCHEDULE

- A. Rooms without Ceilings: Upright sprinklers.
- B. Rooms with Suspended Ceilings: Recessed sprinklers, Concealed sprinklers.
- C. Wall Mounting: Sidewall sprinklers.
- D. Sprinklers Subject to Freezing: Upright, pendent, or sidewall, dry sprinklers as indicated.
- E. Special Applications: Extended coverage or quick-response sprinklers as indicated.
- F. Sprinkler Finishes: White enamel in finished spaces, rough bronze in unfinished spaces, and white in residential spaces. Provide escutcheons in finished and residential spaces.
- G. Install sprinklers in suspended ceilings in center of long dimension of ceiling panels.

### 3.5 PIPING SCHEDULE

- A. Use steel pipe with threaded, press-seal, roll-grooved, or cut-grooved joints.
  - 1. For steel pipe joined by threaded fittings, use Schedule 40.
  - 2. For steel pipe joined by welding or roll-grooved pipe and fittings, use Schedule 10.
  - 3. For steel pipe NPS 2" and smaller, joined by threaded fittings, use Schedule 40 pipe.
- B. Use copper tube with wrought-copper fittings and brazed joints.
- C. Use CPVC plastic pipe and fittings and metal-to-plastic transition fittings with solvent-cemented joints.
- D. Pipe between Fire Department Connections and Check Valves: Use galvanized-steel pipe with flanged or threaded joints.
- E. Install shutoff valve, check valve, and or backflow preventer, pressure gage, drain, and other accessories indicated at connection to water service piping.

### 3.6 TESTING

- A. Flush, test, and inspect sprinkler piping systems according to NFPA 13.

END OF SECTION 211000

## SECTION 211313 - FIRE PROTECTION NFPA13R

### PART 1 - GENERAL

#### 1.1 SCOPE

- A. Provide all labor, materials, equipment, drawings and services to perform all operations required for complete installation of fire protection systems and related work specified herein.
- B. The system shall be installed by an experienced firm, regularly engaged in the installation of automatic fire protection systems.

#### 1.2 QUALITY ASSURANCE

- A. Codes and Standards: Provide and install fire sprinkler system complete with all required accessories in accordance with the provisions of the following:
  - 1. National Fire Protection Association Standard NFPA 13, NFPA 13R and NFPA 24, and all applicable sections.
  - 2. All Federal, State, and Local Codes.
  - 3. Owner's insurance carrier's guidelines.
- B. All equipment and devices shall be UL/FM approved.
- C. Insurance Underwriter - Fire Protection Contractor shall verify insurance underwriter and install a fire protection system in accordance with the underwriter's requirements without additional costs.

### PART 2 - PRODUCTS

#### 2.1 PIPING

- A. General
  - 1. All pipe shall be new, UL/FM approved, 175 PSI working pressure, conforming to ASTM specifications, and have the manufacturer's name or brand, along with the applicable ASTM standard, marked on each length of pipe.
  - 2. Within light hazard occupancies and in residential occupancies up to four stories. post-chlorinated polyvinyl chloride (CPVC) orange colored pipe meeting cell class 2344T-B as defined by ASTM D1784 and listed by the National Sanitation Foundation for use with potable water and listed by UL for use in wet automatic fire sprinkler systems and bearing the UL logo, may be used. Approved products: Blazemaster, ExtinguishSure.

#### 2.2 FITTINGS

- A. Above Ground
  - 1. Piping shall be joined by threaded, grooved, solvent welded or flanged fittings.



B. Below Ground

1. Underground piping shall be NSF approved pressure water piping meeting AWWA C900 standard. Pressure class shall be 150 PSIG (DR18), unless noted otherwise on drawings. Post-Chlorinated Polyvinyl Chloride (CPVC) orange colored pipe meeting cell class 2344T-B as defined by ASTM D1784 and listed by the National Sanitation Foundation for use with potable water and listed by UL for use in wet automatic fire sprinkler systems and bearing the UL logo, may be used. Approved products: Blazemaster, ExtinguishSure.

PART 3 - INSTALLATION

3.1 PIPING TESTS

- A. Tests will be conducted by the Contractor, per NFPA 13, NFPA 13R and NFPA 24 and all piping shall be proven tight in the presence of the Fire Marshal.
- B. The fire protection system including underground shall be hydrostatically tested in accordance with applicable NFPA Standards.

3.2 INSPECTIONS

- A. Inspection and final approval shall be by local Fire Department, Insurance Carrier and Architect.

END OF SECTION 211313

SECTION 211314 - FIRE PROTECTION NFPA13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Conditions of the Contract for Construction, the applicable portion of Division 1, Supplementary Conditions and the applicable portions of Division 15, Mechanical General Provisions shall apply to all work under this section of the specifications.

1.2 SCOPE

- A. Provide all labor, materials, equipment, drawings and services to perform all operations required for complete installation of fire protection systems and related work specified herein. Design to NFPA13, NFPA 13R, NFPA 14, NFPA-20.
- B. Installer: The Subcontractor for the underground piping installation shall be a duly licensed Contractor I or V licensed by the State in accordance with the local authority, regularly engaged in the installation of underground piping and fully familiar with all local conditions, codes and requirements with at least 5 years of successful installation experience on work similar to this Project. This Subcontractor is hereby required to submit his state license number (i.e. CFC123456) and identify to whom it is assigned for verification purposes, and to prevent unlicensed persons from performing said work. Confirmation shall be on a standard AIA Form #305 - "Contractor Qualification Statement" or as requested by Owner's Representative and submitted with the shop drawings.
- C. Prior to the start of any work submit shop drawings for all equipment and material to the Engineer for approval.
- D. All submittals of catalog materials shall be complete and bound in a 3-ring vinyl folder with the job name and the name of the installing contractor on the cover. Piecemeal and incomplete submittals are not acceptable. Electronic submittals of catalog materials are permitted, provided they are in PDF format, and indexed, with the job name and the name of the installing contractor on the cover.
- E. Catalog material shall be clearly and neatly marked to show applicable model numbers and options. Materials not relevant to the job shall be deleted or clearly marked. Only electronic submittals will be accepted in PDF format.
- F. Submit catalog data on the following:
- Piping and fittings - above ground and underground
  - Pipe hangers
  - Sprinkler heads
  - Valves
  - Fire department Siamese connections
  - Water flow switches
  - Valve monitor switches
  - Fire Pump
  - Jockey Pump

Fire Pump Controllers  
Jockey Pump Controllers  
Dry Pipe Valves  
Air Compressors  
Post indicator valves  
Backflow preventers

- G. All piping shall be hydraulically sized for the available water supply based on sprinkler and standpipe demands. Pipe Hydraulic calculations shall have a residual safety margin of not less than 10% of the available water supply.
- H. Any apparatus, machinery, material, small items or incidentals not mentioned herein, which may be found necessary to complete or perfect any portion of the installation in a substantial manner and in compliance with the requirements stated, implied or intended in these specifications, shall be furnished without extra cost to the Owner. This shall include Siamese connections, post indicator valves, backflow checks, etc.
- I. Pay for all fees and costs arising from these installations and for any and all destruction to property, both public and private, which may arise from service tap-ins, including the tearing up and replacing of streets, sidewalks, trees, shrubs, etc., if required by the utilities policy. This Contractor shall include in his bid the amount charged by local water utilities, or others if required, to provide service, construct valve pit, etc. If other requirements alter this arrangement, the costs must be included.
- J. This installation and the materials specified and used are subject to the final approval of the fire marshal and the local water company.

### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: Provide and install all unit and accessories in accordance with the provisions of the following:
  - 1. National Fire Protection Association Standard No. 13, 13R, 14, 20, 24, and all applicable sections.
  - 2. All Federal, State, and Local Codes.
  - 3. Owner's insurance carrier's guidelines.
- B. All equipment and devices shall be UL/FM approved.
- C. Insurance Underwriter - Fire Protection Contractor shall verify insurance underwriter and install a fire protection system in accordance with the underwriter's requirements without additional costs.

### 1.4 COOPERATION WITH OTHER TRADES

- A. Contractor shall give full cooperation to other trades and shall furnish (in writing, with copies to the Architect) any information necessary to permit the work of all trades to be installed satisfactorily with least possible interference or delay. Coordinate sprinkler head locations with architectural reflected ceiling plan and submit for approval by Architect and Engineer.
- B. Where the work of Contractor will be installed in close proximity to work of other trades, or where there is evidence that work will interfere with work of other trades, he shall assist in

working out space conditions to make a satisfactory adjustment. The Contractor shall prepare composite working drawings at no less than 1/8" scale clearly showing how his work is to be installed in relation to the work of all trades. Drawings shall be submitted and approved before any materials are ordered or fabricated.

- C. The Contractor shall furnish to other trades, as required, all necessary templates, patterns setting plans and shop details for the proper installation of the work and for the purpose of coordinating adjacent work.
- D. Contractor shall submit to the Architect and the Structural Engineer for approval, a coordinated sleeve shop drawing which locates and sizes all sprinkler sleeve penetrations.
- E. Contractor shall visit site to check all existing conditions prior to bidding.
- F. Backfill and compaction to normal grade will be by this Contractor.
- G. Contractor to verify water tables and shall be responsible for de-watering if required.
- H. Coordinate sprinkler spacing with all other trades as required.
- I. Coordinate with Electrical Contractor to ensure all fire protection electrical items have been properly completed.
- J. Electrical switches shall be furnished and installed under this Division and wired under Division 16.

## PART 2 - PRODUCTS

### 2.1 PIPING

#### A. General

- 1. All pipe shall be new, UL/FM approved, 175 psi working pressure, conforming to ASTM specifications, and have the manufacturer's name or brand, along with the applicable ASTM standard, marked on each length of pipe.

#### B. Above Ground

- 1. Above ground interior pipe 2" and smaller shall be threaded, Schedule 40 black steel in accordance with ASTM A795 or A53, and shall be hydrostatically tested at the mill to comply with the applicable ASTM standards. At Contractor's option, and if allowed by the local authorities having jurisdiction, the following piping may be used for branch lines only, and only in sizes up to and including 2".
  - a. Steel pipe, lightweight, threadable (ASTM A-135) exterior galvanized, with fittings as recommended by the manufacturer. Allied "XL" or approved equal.
  - b. CPVC, CTS, SDR-13.5, rigid (ASTM F442) plastic pipe with (ASTM F439) schedule 80, solvent cement socket welded type pressure fittings. Piping shall comply with ASTM/NSF-pw Standards 14 and 61.
- 2. Above ground interior pipe 2-1/2" or larger shall be grooved schedule 10 black steel ASTM A135. Grooves shall be rolled only (die cut grooving will not be permitted) and

they shall be dimensionally compatible with the coupling. All ASTM A135 sprinkler pipe must be tested with a non-destructive electric test for continuous and uninterrupted inspection of the welded seam at the factory.

C. Underground

1. All underground piping 4" and larger shall be mechanical joint, ductile iron in conformance to the latest AWWA specification. Fittings shall be rated at 250 PSI working pressure.
2. At Contractor's option, UL/FM, NSF approved PVC pressure water pipe meeting AWWA C900 may be used only at locations 5 feet beyond outside of the building or where permitted by authorities having jurisdiction. Pipe shall be furnished with cast iron outside diameter for use with cast iron mechanical joint fittings. Pressure class shall be 150 psig, (DR18). Pressure class shall be 200 psig (DR14) downstream of FDC's. Manufacturer: CertainTeed, Clow, or Manville© .
3. PVC pipe shall require insulated metallic locating wire (14 gauge copper) capable of detection by a cable locator and shall be buried directly above the centerline of the pipe. Locating wire shall terminate at the top of box in such a manner so as not to interfere with valve operation. Use duct tape as necessary to hold wire directly on the top of the pipe.

D. Exposed Exterior Piping

1. Supply pipes, risers, branch lines, fittings, hangers, and all fire protection materials that are in location exposed to the exterior shall be galvanized, inside and outside, Schedule 40 steel. Galvanized painting shall not be permitted.

2.2 FITTINGS

A. Above Ground

1. Piping shall be joined using threaded, grooved, or flanged fittings.
2. Cast iron fittings: Standard weight fittings shall be UL rated for 175 psig water working pressure. Fittings shall meet ASTM A-126. Threaded fittings shall meet ANSI B16.4. and B16.1.
3. Grooved joints and fittings: 250 psi working pressure, grooved mechanical fittings and couplings using an elastomeric gasket enclosed by a split malleable or ductile iron housing. Malleable iron shall meet ASTM A-47, ductile iron shall meet ASTM A-536. Self grooving couplings and fittings employing set screws or plain end pipe shall not be used. Acceptable manufacturers are Victaulic, Reliable, Tyco, or Grinnell. The products of only one manufacturer shall be used.
4. Flanged fittings shall be threaded, cast iron, short body, Class 125, black, and in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B18.2. Grooved flanges or uni-flanges shall not be permitted. Fittings shall be Stockham or ITT Grinnell.

B. Below Ground

1. Underground fittings shall be UL-FM approved, cement lined ductile iron, Class 250, Mechanical Joints. Install in strict accordance with NFPA 24.
2. All underground bends shall be rodded and thrust blocked. All pipe shall be rust-free. Fittings and rods shall be coated with coal tar in an asphaltic base.

## 2.3 FIRE SPRINKLERS

- A. Sprinklers shall be manufactured by Tyco, Reliable or Viking.
- B. Sprinkler heads shall be as indicated and specified in Fire Sprinkler Schedule, See Contract Drawings. Also, see drawings for sprinkler types and locations. Temperature ratings of fusible elements shall be in accordance with NFPA Standard No. 13.
- C. Spare Sprinkler: The Contractor shall furnish spare automatic sprinklers in accordance with NFPA Standard No. 13. The sprinklers shall be placed in a suitable container and shall be representative of and in proportion to the number of each type and temperature rating of the sprinklers installed. Spare flush type heads with suitable containers shall be provided in areas using these types. In addition to the spare sprinklers, the Contractor shall furnish no fewer than two special sprinkler wrenches, or at least one sprinkler wrench for each container or sprinkler box, whichever is greater.
- D. Concealed Sprinkler Heads: Contractor shall obtain samples of the ceiling systems to be installed from the Architect and then shall send the samples to: Firematic Sprinkler Devices, Inc., 900 Boston Turnpike, Shrewsbury, MA 01545 (Tel: 800-225-7288). Firematic will then custom match the color and pattern of the ceiling system samples and transfer these elements onto the sprinkler cover plates.

## 2.4 ELECTRIC WATER FLOW ALARM INDICATORS

- A. Shall be of the vane-type and installed on the sprinkler system piping as required. Alarm indicators shall be designed for mounting on either vertical or horizontal piping, shall have dual contacts for supervisory monitoring and shall have a sensitivity setting to signal any flow of water that equals or exceeds the discharge from one sprinkler head. Each alarm indicator shall be Underwriters Laboratories listed and Factory Mutual approved, Model WFD similar to that manufactured by Notifier.

## 2.5 SUPERVISORY SWITCHES

- A. Furnish devices for installation of electrical valve supervisory switches, whose function is to sound a trouble alarm if any system valve is closed, or if any normally closed valve is opened. Switches shall be provided with dual contacts to provide monitoring function. Supervisory switches shall be Underwriters Laboratories listed and Factory Mutual approved, Model NGV as manufactured by Simplex, or approved equal.

## 2.6 VALVES

- A. Valve size, working pressure, and the manufacturer's name or trademark shall be permanently affixed to the body of all valves. Valves shall be slow close. Drain, test and gauge valves are exempt from these requirements.

- B. Above Ground

"Standard weight" valves for service up to 175 psig:

1. Supervised shutoff valves 2" and smaller for above ground service shall be UL listed OS & Y (rising stem) design with bronze body and mountings and screw connections. At Contractor's option, supervised shut-off valves 2" and smaller may be slow close indicating butterfly valve assembly with built-in supervisory tamper switch. UL/FM rated at 175 psi with single circuit switch and screwed ends. Bronze housing and body. Milwaukee Model # BBVSCS02 or approved equal.
2. Supervised shut-off valves 2-1/2" and larger for above ground service shall be UL listed OS & Y design with cast iron body, bronze mountings and flange connections. Open counterclockwise. At Contractor's option, supervised shut-off valves 2 1/2" and larger may be slow close outside indicating butterfly valve assembly with built-in supervisory tamper switch. UL/FM rated at 175 PSI with single circuit switch and grooved ends, Bronze body housing. Mueller B-3250-52, Central Model BFV, Victaulic Series 708-50D, or approved equal.
3. Check valves smaller than 2-1/2" shall be Y-pattern clapper type with renewable seat and disc, bronze body, and screw connections. Minimum water working pressure 200 psig.
4. Check valves 2-1/2" and larger shall be UL listed clapper type with cast iron body and bronze mountings, rubber faced disc, flanged or grooved connections and bolted bonnet. Provide automatic ball drip for each check valve where temperatures fall below 40F.
5. Trim valves: gate, globe, angle, and check valves used for "trim" in the fire protection system shall have all bronze construction and screwed connections. Valves shall have a minimum 200 psig working pressure.
6. Dry Pipe Valves
  - a. Dry pipe valve shall be a UL listed/FM approved, latching differential type valve designed to separate the water supply from the dry pipe sprinkler system and shall combine a positive latching clapper and air plate assembly with a differential air to water seat design. The valve shall be capable of operating a water motor alarm and an electric pressure alarm switch and shall be provided complete with all accessories and appurtenances required for the proper operation of the dry pipe system. Provision shall be made to prevent excessive water columning.
  - b. An approved quick-opening device for each dry pipe valve having a system capacity greater than 500 gallons shall be provided. Viking 2 1/2" size and above, flanged inlet and grooved outlet.

C. Underground

1. OS & Y Valve
  - a. Outside screw and yoke valve shall be rising stem with resilient seat gate valve. Valve shall have a cast iron body and disc. Valve shall comply with AWWA C-509 and ASTM A-126 Class B Standards. Valve shall be 7224 by Central or equal. Provide weatherproof tamper switch with two sets of SPDT contacts.
2. Roadway Box Valve
  - a. Valve for roadway box shall seat gate valve with non-rising stem. Valve shall have a cast iron body and disc. Valve shall comply with AWWA C-509 and ASTM A-126 Class B Standards. Valve shall be Model 7214 by Central or equal. Roadway valve box shall be two-piece cast iron with cap.
3. Check Valve
  - a. Underground check valve shall be Class 125, iron body with renewable brat and disc.

2.9 FIRE DEPARTMENT CONNECTIONS

- A. Wall mounting type shall be 2-1/2" x 2-1/2" x 4" polished chrome plated brass, flush mounted, double clapper siamese with matching caps and chains. Provide escutcheon lettered "AUTO SPKLR - STANDPIPE". Potter Roemer 5020.
- B. Free standing type shall be 2-1/2" x 2-1/2" x 4" polished chrome plated brass, double clapper siamese with matching caps and chains. Provide escutcheons lettered "AUTO SPKLR - STANDPIPE". Elkhart No. 15.
- C. Hose threads shall match local fire department standard.

#### 2.10 FLOORS AND WALL PLATES

- A. All exposed pipes passing through floors, walls or ceiling shall be fitted with split ring plates covering the sleeves. Plates in finished rooms shall be chromium-plated. Plastic is not acceptable.

#### 2.11 GAUGES

- A. Shall be similar to that manufactured by Potter-Roemer 0-300 psi. Provide all gauges with pulsation damper and shut-off cock.

#### 2.12 DRAINS

- A. The entire fire protection system shall be provided with drainage facilities, at low points in the system.

#### 2.13 INSPECTOR'S TEST/DRAIN CONNECTION

- A. Shall be provided as indicated on the plans and details, with sight glass, mounted max of 7' AFF and terminate outdoors over concrete splash blocks provided by the general Contractor.
- B. Provide and install access panel if required at contractor's option, and if acceptable to the local authorities having jurisdiction, Victaulic Style 718 (with threaded connections) alarm test module, G/J innovations, "SURE-TEST" or AGF Manufacturing's "TEST AN DRAIN" unit assembly may be provided.

#### 2.14 IDENTIFICATION

- A. Provide and install identification signs as required by NFPA 13.

### PART 3 - INSTALLATION

#### 3.1 PIPE AND FITTINGS

- A. Installation: The piping shall be installed complete. All piping shall be cut accurately from dimensions established at the project site and allowances shall be made for the clearance of windows, doors, and other openings. No part of the building structure may be cut to allow for the installation of piping unless specifically noted on the drawings or approved in writing.



1. All piping shall be installed parallel or perpendicular to the building construction and shall be installed so as to allow for expansion and drainage.
- B. Screwed joints shall be made with standard pipe thread with ends of pipe reamed to full diameter, no more than three threads shall be left exposed at each fitting, and an approved compound applied to the male thread only.
1. All screw joints shall be made with the best quality pipe joint compound, carefully placed on the threads of the pipe and not on the fittings.
  2. All cut thread pipe shall have cutting burrs and sharp edges reamed out.
- C. Welded joints shall be made in accordance with the procedure outlined in the ASA Piping Code and before assigning any welder to work covered, the Contractor shall provide for the approval of the name of pipe welders to be employed in the work, together with certification that each of these welders has passed qualification tests as prescribed by the National Certified Pipe Welding Bureau, or by other reputable testing laboratory or agency using procedures approved by the ASME or the AWG. The Contractor shall use only approved factory manufactured welding type fitting, for the intersection welding or branching to mains. Valves and specialties shall have screwed or flanged joints.
1. Welding trees, ells, reducers and caps shall be of wrought or forged construction similar to those manufactured by Tube Turns, Inc. In lieu of wrought or forged welding tees for branch outlets, weld-lets or welding nipples may be used; provided, first that the nipples are accurately copied in the shop to fit the pipes and leveled for field welding; and provided, second that openings in the walls of pipes be cut to full inside diameter of the nipples; and third, that the outlet diameter shall be less than three-quarters the diameter of the main.
  2. For connections on welded piping to valves 2-1/2" and over and of other accessories required to be flanged, standard forged welding neck flanges shall be used. The flange face shall be in every case perpendicular to the axis of the pipe or valve.
  3. No direct welded connections shall be made to valves, strainers, apparatus and associated equipment.
  4. Welding shall be limited to shop welding only in accordance with NFPA-13. Field fabrication by welding is unacceptable.
- D. Eccentric reducing fittings or eccentric reducing coupling must be installed to bring bottoms of mains in line and prevent pockets. Eccentric fittings will not be required on water mains. Ends of pipes shall be reamed out before being made up. Necessary fittings or bands must be used as springing of pipes will not be permitted. Screw pipes and fittings are to be put together with red lead or an approved compound applied to the pipes and not to fittings.
- E. All pipes which pass through sleeves in floors and smoke walls shall have the space between the pipes and sleeves fire stopped and smoke stopped with a listed assembly.
- F. The installation of all pipes must be such as to allow for expansion using offsets, swing joints, etc., as shown or as may be necessary to prevent undue strain on piping.
- G. All piping and valves shall be installed rust-free.
- H. Contractor shall install sprinkler heads at distances, as per NFPA, from surface mounted lights, speakers etc.

### 3.2 FLUSHING

- A. Extreme care shall be exercised by the Contractor to prevent dirt and other foreign matter from entering pipe or components of system during construction. Pipe stored on project shall have open ends capped and equipment shall have all openings fully protected. Before erection, each piece of pipe, fitting or valve shall be visually examined, and all dirt removed.
- B. The Contractor shall thoroughly clean all equipment installed under this section of the work, temporary service, but in any case, prior to final inspection by the Owner's representatives.
- C. Comply with the manufacturer's printed instruction, except where more stringent requirements are shown or specified and except where manufacturer's technical representation directs otherwise.
- D. Underground mains and lead-in connections to risers shall be flushed before connection is made to systems piping in order to remove foreign materials which may have entered the underground piping during the course of the installation. For all systems, the flushing operation shall be continued until water is clear. Provisions shall be made for the disposal of water issuing from test outlets to avoid property damage.

### 3.3 PIPING TESTS

- A. Tests will be conducted by the Contractor per NFPA 13, 24 and 25 and all piping shall be proven tight in the presence of the Fire Marshal. The Contractor shall provide all equipment required and tests shall be as required by the Fire Marshal.
- B. Until system is completed, tested and accepted, this Contractor shall be responsible for repair of leaks, and accidental breaks.
- C. The fire protection system including underground shall be hydrostatically tested to 200 psi for a period of two (2) hours, or at 50 psi in excess of the maximum pressure, when the maximum pressure to be maintained in the system is in excess of 150 psi. All openings in sprinkler piping shall be plugged; the system shall be filled with water and tested.
- D. Secure final certificates of approval and deliver to the architect. Advance notice of all tests shall be given to the local fire department, architect and insuring agency at least twenty-four (24) hours prior to the testing time so that the authorized representatives may be present at the test. Upon satisfactory completion of the test, a written approval, signed by the Architect, shall be given to the Contractor. This written approval, however, does not relieve the Contractor of responsibility for any failure during the period of the guarantee.

### 3.4 GUARANTEE

- A. The Contractor guarantees by his acceptance of the contract, that all work installed will be free from any and all defects in workmanship and/or materials, and that all apparatus will develop capacities and characteristics specified, and that if during the period of one year from date of certificate of completion and acceptance of work, any such defects in workmanship, materials, or performance appear, he will without cost to the Owner, remedy such defects within a reasonable time. In default thereof, Owner may have such work done and charge the cost to the Contractor. Provide quarterly inspections for a period of one year after completion of the facility.

### 3.5 INSPECTIONS

- A. Inspection and final approval shall be by local Fire Department, Insurance Carrier and Architect/Engineer.

### 3.6 CLEANING

- A. Thoroughly clean all piping, hangers and equipment installed under this contract.

### 3.7 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Deliver to the Architect three (3) copies of the complete operating and maintenance instructions for the equipment furnished and installed under this contract. Provide the aforementioned parties with parts lists for all new equipment items. Each set shall be provided in a plastic or hard back binder with notations of contents.

### 3.8 HYDRAULIC CALCULATIONS

- A. Hydraulic calculations shall be performed by the Fire Sprinkler Contractor and shall be submitted to the Office Of the Engineer along with shop drawings. Copies of these calculations shall be submitted to the Fire Marshall or AHJ along with shop drawings and Material Data Catalogs.
- B. No changes or modifications to the sprinkler design will be allowed that would invalidate these calculations.
- C. Maximum velocities in piping shall not be above 23 feet per second for above ground piping and 15 feet per second for below grade piping.

### 3.9 ADDITIONAL HEADS

- A. In addition to other requirements of these specifications, this Contractor shall include in his bid the furnishing and installation of all piping, hangers, fittings, sprinkler heads, etc. to provide the addition of 15 heads at locations as required or where directed.

END OF SECTION 211314

## SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

### 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 SECTION REQUIREMENTS

- A. Submittals:
  - 1. Product Data: For each type of product indicated.
  - 2. Hangers and Supports:
    - a. Shop Drawings: Signed and sealed by a qualified professional engineer.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Hangers and Supports for Plumbing Piping Equipment:
  - 1. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
    - a. Design supports for multiple pipes capable of supporting combined weight of supported systems, and system contents.
    - b. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

#### 2.2 SLEEVES AND SLEEVE SEALS

- A. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- B. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- C. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- D. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

### 2.3 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
  1. Characteristics: Nonshrink; recommended for interior and exterior applications.
  2. Design Mix: 28-day compressive strength.
  3. Packaging: Premixed and factory packaged.

### 2.4 ESCUTCHEONS AND FLOOR PLATES

- A. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
- C. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

### 2.5 PRESSURE GAGES AND TEST PLUGS

- A. Direct-Mounted, Metal-Case Dial-Type Pressure Gages:
  1. Standard: ASME B40.100.
  2. Case: Sealed
  3. Movement: Mechanical, with link to pressure element and connection to pointer.
  4. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
  5. Pointer: Dark-colored metal.
  6. Window: Plastic.
  7. Ring: Metal.
  8. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.
- B. Test Plug: Corrosion-resistant brass or stainless-steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating 500 psig at 200 deg F.

### 2.6 HANGERS AND SUPPORTS FOR PLUMBING PIPING EQUIPMENT

- A. Carbon-Steel Pipe Hangers and Supports:
  1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.

2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer

C. Fastener Systems:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

D. Miscellaneous Materials:

1. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
2. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - a. Properties: Nonstaining, noncorrosive, and nongaseous.
  - b. Design Mix: 5000-psi, 28-day compressive strength.

## PART 3 - EXECUTION

### 3.1 GENERAL PIPING INSTALLATIONS

- A. Install piping free of sags and bends.
- B. Install fittings for changes in direction and branch connections.
- C. Sleeves:
  1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
  2. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
    - a. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

3. Install sleeves for pipes passing through interior partitions.
4. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078446 "Penetration Firestopping."

D. Sleeve-Seal-System Installation:

1. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
2. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

E. Escutcheons and Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.
4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

F. Meters and Gages:

1. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
2. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.
3. Adjust faces of meters and gages to proper angle for best visibility.

G. Install unions at final connection to each piece of equipment.

H. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

I. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

### 3.2 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

- C. Install powder-actuated fasteners and mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.
- D. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- E. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
  - 1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
  - 2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
- F. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
  - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
  - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

### 3.3 GENERAL EQUIPMENT INSTALLATIONS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

END OF SECTION 220500



## SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.

### PART 2 - PRODUCTS

#### 2.1 SYSTEM DESCRIPTION

- A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
- B. NSF Compliance: NSF 61 for valve materials for potable-water service.

#### 2.2 GENERAL-DUTY VALVES

- A. Valve Sizes: Same as upstream piping unless otherwise indicated.
- B. Valves in Insulated Piping: With 2-inch stem extensions.
- C. End Connections: Threads shall comply with ANSI B1.20.1. Flanges shall comply with ANSI B16.1 for cast-iron valves and with ANSI B16.24 for bronze valves. Solder-joint connections shall comply with ANSI B16.18.
- D. One-Piece, Copper-Alloy Ball Valves: Brass or bronze body with chrome-plated bronze ball, PTFE or TFE seats, and 400-psig minimum] CWP rating.
- E. Bronze, Swing Check Valves: Class 125, bronze body with bronze disc and seat.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Use ball valves for shutoff duty; globe and ball for throttling duty.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves for each fixture and item of equipment.

- D. Install three-valve bypass around each pressure-reducing valve using throttling-type valves.
- E. Install valves in horizontal piping with stem at or above center of pipe.
- F. Install valves in a position to allow full stem movement.
- G. Install check valves for proper direction of flow in horizontal position with hinge pin level.

END OF SECTION 220523

## SECTION 221116 - DOMESTIC WATER PIPING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For transition fittings and dielectric fittings.
2. Product for solvent cements and adhesive primers, documentation including printed statement of VOC content.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."

#### 2.2 PIPE AND FITTINGS

- A. Hard Copper Tubing: ASTM B 88, Types L and M, water tube, drawn temper with wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
1. Copper Unions: Cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
  2. Joining Materials: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder.
- B. Soft Copper Tubing: ASTM B 88, Types K and L, water tube, annealed temper with copper pressure fittings, cast-copper-alloy or wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
1. Joining Materials: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder.
- C. Galvanized-Steel Piping: ASTM A 53/A 53M, Schedule 40, galvanized-steel pipe, with ASME B16.4, Class 125, galvanized, standard pattern gray-iron, threaded fittings.
- D. CPVC Piping: ASTM F 441/F 441M, Schedule 40 pipe with ASTM F 438, CPVC Schedule 40 socket-type fittings.
- E. PEX Tube and Fittings: ASTM F 877, SDR 9 PEX tubing and ASTM F 1807, metal insert-type fittings with copper or stainless-steel crimp rings.

1. Manifold: ASTM F 877 plastic or corrosion-resistant-metal assembly, with a plastic or corrosion-resistant-metal valve for each outlet.
- F. PVC Piping: ASTM D 1785, Schedule 40 pipe with ASTM D 2466, Schedule 40, socket-type fittings.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for basic piping installation requirements.
- B. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for wall penetration systems.
- C. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for pressure gages and Section 221119 "Domestic Water Piping Specialties" for drain valves and strainers.
- D. Install domestic water piping without pitch for horizontal piping and plumb for vertical piping.
- E. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- F. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for basic piping joint construction.
  1. Soldered Joints: Comply with procedures in ASTM B 828 unless otherwise indicated.
- G. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for pipe hanger and support devices.
  1. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
    - a. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
    - b. NPS 1-1/2: 108 inches with 3/8-inch rod.
    - c. NPS 2: 10 feet with 3/8-inch rod.
    - d. NPS 2-1/2: 11 feet with 1/2-inch rod.
    - e. Support vertical piping at each floor.
  2. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:
    - a. NPS 1 and Smaller: 36 inches with 3/8-inch rod.

- b. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
  - c. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
  - d. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.
- 3. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:
  - a. NPS 1 and Smaller: 32 inches with 3/8-inch rod.
  - b. Install hangers for vertical PEX piping every 48 inches.
- 4. Install vinyl-coated hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
  - a. NPS 2 and Smaller: 48 inches with 3/8-inch rod.
  - b. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
  - c. Install supports for vertical PVC piping every 48 inches.
- H. Install flexible connectors in suction and discharge piping connections to each domestic water pump and in suction and discharge manifold connections to each domestic water booster pump.

### 3.2 INSPECTING AND CLEANING

- A. Inspect and test piping systems as follows:
  - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
  - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
- B. Clean and disinfect potable and non-potable domestic water piping by filling system with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

### 3.3 PIPING SCHEDULE

- A. Underground, Service Entrance Piping: Soft copper tubing Schedule 80 PVC piping.
- B. Aboveground Distribution Piping: CPVC piping.

### 3.4 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - 1. Shutoff Duty: Use bronze ball valves.

- B. Install ball valves close to main on each branch and riser serving two or more plumbing fixtures or equipment connections and where indicated.
- C. Install ball valves on inlet to each plumbing equipment item, on each supply to each plumbing fixture not having stops on supplies, and elsewhere as indicated.
- D. CPVC ball, butterfly, and check valves may be used in matching piping materials.
- E. Install swing check valve on discharge side of each pump and elsewhere as indicated.
- F. Install ball valves in each hot-water circulating loop and discharge side of each pump.

END OF SECTION 221116

## SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product.
2. Operation and maintenance data.

### PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- ##### A. Potable-water piping and components shall comply with NSF 61. Mark "NSF-pw" on plastic piping components.

#### 2.2 PERFORMANCE REQUIREMENTS

- ##### A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

#### 2.3 MANUFACTURED UNITS

##### A. Hose-Connection Vacuum Breakers :

1. Standard: ASSE 1011.
2. Body: Bronze, non removable, with manual drain.
3. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
4. Finish: bronze.

##### B. Reduced-Pressure-Principle Backflow Preventers :

1. Standard: ASSE 1013.
2. Operation: Continuous-pressure applications.
3. Pressure Loss: 10 psig maximum, through middle third of flow range.
4. Body: Bronze for NPS 2 and smaller; for NPS 2-1/2 and larger.
5. End Connections: Threaded for NPS 2 and smaller; for NPS 2-1/2 and larger.
6. Accessories:
  - a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
  - b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.

c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

C. Clothes Washer Outlet Boxes :

1. Mounting: Recessed.
2. Material and Finish: Plastic box and faceplate.
3. Faucet: Combination valved fitting or separate hot- and cold-water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets.
4. Supply Shutoff Fittings: NPS 1/2 gate, globe, or ball valves and NPS 1/2 copper, water tubing.
5. Drain: NPS 2 standpipe and P-trap for direct waste connection to drainage piping.
6. Inlet Hoses: Two 60-inch- long, rubber household clothes washer inlet hoses with female, garden-hose-thread couplings. Include rubber washers.
7. Drain Hose: One 48-inch- long, rubber household clothes washer drain hose with hooked end.

D. Icemaker Outlet Boxes :

1. Mounting: Recessed.
2. Material and Finish: Plastic box and faceplate.
3. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
4. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

E. Hose Bibbs :

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: operating key.
12. Operation for Service Areas: Operating key.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

F. Nonfreeze Wall Hydrants :

1. Standard: ASME A112.21.3M for concealed outlet, self-draining wall hydrants.
2. Pressure Rating: 125 psig.
3. Operation: Loose key.



4. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
5. Inlet: NPS 3/4 or NPS 1.
6. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
7. Box: Deep, flush mounted with cover.
8. Box and Cover Finish: Polished nickel bronze.
9. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
10. Nozzle and Wall-Plate Finish: Polished nickel bronze
11. Operating Keys(s): One] with each wall hydrant.

G. Ball-Valve-Type, Hose-End Drain Valves :

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7.

H. Stop-and-Waste Drain Valves :

1. Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.
2. Pressure Rating: 200-psig minimum CWP or Class 125.
3. Size: NPS 3/4.
4. Body: Copper alloy or ASTM B 62 bronze.
5. Drain: NPS 1/8 side outlet with cap.

I. Water-Hammer Arresters :

1. Standard: ASSE 1010 or PDI-WH 201.
2. Type: [Metal bellows] [Copper tube with piston].
3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

J. Supply-Type, Trap-Seal Primer Device :

1. Manufacturers:
2. Basis-of-Design Product:
  - a. MIFAB, Inc.
  - b. Precision Plumbing Products, Inc.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
3. Standard: ASSE 1018.

4. Pressure Rating: 125 psig minimum.
5. Body: Bronze.
6. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
7. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
8. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

K. Drainage-Type, Trap-Seal Primer Device :

1. Manufacturers:
2. Basis-of-Design Product:
  - a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
3. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 minimum, trap makeup connection.
4. Size: NPS 1-1/4 minimum.
5. Material: Chrome-plated, cast brass.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
- B. Install water regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- C. Install balancing valves in locations where they can easily be adjusted.
- D. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
- E. Set nonfreeze, nondraining-type post hydrants in concrete or pavement.
- F. Set freeze-resistant yard hydrants with riser pipe in concrete or pavement. Do not encase canister in concrete.
- G. Install water-hammer arresters in water piping according to PDI-WH 201.
- H. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- I. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test each reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
2. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
3. Prepare test and inspection reports.

END OF SECTION 221119

## SECTION 221316 - SANITARY WASTE AND VENT PIPING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.
2. For solvent cements and adhesive primers, documentation including printed statement of VOC content.
3. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.

#### 1.2 FIELD CONDITIONS

- ##### A. Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
1. Notify Architect or Owner no fewer than two days in advance of proposed interruption of sanitary waste service and do not proceed without written permission.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- ##### A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

Soil, Waste, and Vent Piping: 10-foot head of water..

- ##### B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- ##### C. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components.

#### 2.2 PIPES AND FITTINGS

- ##### A. Copper Drainage Tube and Fittings: ASTM B 306, Type DWV drawn temper with ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
1. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.

- a. Flange Gasket Materials: ASME B16.21, full-face, flat, nonmetallic, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
  - b. Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
2. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.
- B. Hub-and-Spigot Cast-Iron Soil Pipe and Fittings: ASTM A 74, Service class; ASTM C 564 rubber gaskets.
  - C. Hubless Cast-Iron Soil Pipe and Fittings: ASTM A 888 or CISPI 301, with ASTM C 1277 shielded couplings.
  - D. PVC Plastic, DWV Pipe and Fittings: ASTM D 2665, Schedule 40, solid wall, plain ends with PVC socket-type, DWV pipe fittings.
    1. Adhesive Primer: ASTM F 656.
      - a. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    2. Solvent Cement: ASTM D 2564.
      - a. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### PART 3 - EXECUTION

#### 3.1 PIPING INSTALLATION

- A. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for basic piping installation requirements.
- B. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- C. Install wall penetration system at each pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for wall penetration systems.
  1. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- D. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not

change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

- E. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- F. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
  - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
  - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
  - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- G. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.
- H. Install underground PVC soil and waste drainage piping according to ASTM D 2321.
- I. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- J. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for basic piping joint construction.
- K. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure unless otherwise indicated.
- L. Comply with requirements in Section 220513 "Common Work Results for Plumbing" for pipe hanger and support devices.

### 3.2 PIPE SCHEDULE

- A. Aboveground Applications: Hubless, cast-iron soil pipe and fittings Hub-and-spigot, cast-iron soil pipe and fittings PVC plastic, DWV pipe and fittings with solvent-cemented joints.
- B. Belowground Applications: Hubless, cast-iron soil pipe and fittings Hub-and-spigot, cast-iron soil pipe and fittings PVC plastic, DWV pipe and drainage-pattern fittings with cemented joints.

END OF SECTION 221316

## SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.
  - a. Include rated capacities, operating characteristics, and accessories for grease interceptors.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

#### 2.2 MANUFACTURED UNITS

##### A. Cleanouts, :

1. Application: Floor cleanout Wall cleanout For installation in exposed piping
2. Body or Ferrule: Cast iron Plastic.
3. Outlet Connection: Threaded Inside calk Spigot.
4. Closure: Brass plug with straight threads and gasket Brass plug with tapered threads Plastic plug.
5. Adjustable Housing Material: Cast iron Plastic with threads set-screws or other device.
6. Frame and Cover Material and Finish: Polished bronze
7. Frame and Cover Shape: Round.
8. Top-Loading Classification: Light Duty.

##### B. Floor Drains, :

1. Manufacturers:
2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
  - a. Commercial Enameling Co.
  - b. Josam Company; Josam Div.
  - c. MIFAB, Inc.
  - d. Prier Products, Inc.
  - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

- f. Tyler Pipe; Wade Div.
  - g. Watts Drainage Products Inc.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.
  - i. Zurn Plumbing Products Group; Specification Drainage Operation.
3. Outlet: Bottom.
  4. Top or Strainer Material: Nickel bronze.
  5. Top of Body and Strainer Finish: Nickel bronze Top Shape: Round Square.
  6. Inlet Fitting: trap seal primer valve connection.
  7. Trap Pattern: Standard P-trap.
  8. Trap Features: Trap seal primer valve drain connection Copy "Plastic Floor Drains" Paragraph below and re-edit for each plastic floor drain required for Project.

C. Plastic Floor Drains, :

1. Manufacturers:
2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
  - a. Canplas LLC.
  - b. IPS Corporation.
  - c. Josam Company; Josam Div.
  - d. Oatey.
  - e. Plastic Oddities; a division of Diverse Corporate Technologies.
  - f. Sioux Chief Manufacturing Company, Inc.
  - g. Zurn Plumbing Products Group; Light Commercial Operation.
3. Standard: ASME A112.6.3.
4. Material: PVC.
5. Seepage Flange: Not required.
6. Outlet: Bottom.
7. Trap Material: Cast iron Plastic drainage piping not required.
8. Trap Pattern: Standard P-trap.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- B. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor unless otherwise indicated.
  1. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
  2. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.



- C. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- D. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

END OF SECTION 221319

## SECTION 224000 - PLUMBING FIXTURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SECTION REQUIREMENTS

- A. Submittals:
  - 1. Product Data for each type of plumbing fixture, including trim, fittings, accessories, appliances, appurtenances, equipment, and supports.
  - 2. Documentation indicating flow and water consumption requirements.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities Americans with Disabilities Act for plumbing fixtures for people with disabilities.
- B. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- C. NSF Standard: Comply with NSF 61, "Drinking Water System Components - Health Effects," for fixture materials that will be in contact with potable water.

#### 2.2 WATER CLOSET

- A. Vitreous-China Water Closet: Elongated, siphon-jet type, floor-mounted, floor ,
  - 1. Manufacturers:
  - 2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
    - a. American Standard Companies, Inc.
    - b. Briggs Plumbing Products, Inc.
    - c. Crane Plumbing, L.L.C./Fiat Products.
    - d. Eljer.
    - e. Gerber Plumbing Fixtures LLC.

- f. Kohler Co.
  - g. Mansfield Plumbing Fixtures
  - h. Sterling Plumbing Group, Inc.
  - i. TOTO USA, Inc.
  - j. Western Pottery, LLC.
3. Flush cycle: 1.6 GPF maximum.

### 2.3 TOILET SEAT

- A. Toilet Seat: Elongated Round front, solid plastic open front without open front with closed front with cover with bumpers and hardware, Commercial, Heavy-Duty Commercial, Standard Residential class.
1. Manufacturers: One of the following:
  2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
    - a. American Standard Companies, Inc.
    - b. Bemis Manufacturing Company.
    - c. Centoco Manufacturing Corp.
    - d. Church Seats.
    - e. Eljer.
    - f. Kohler Co.
    - g. Mainline Manufacturing.
    - h. Olsonite Corp.
    - i. Sperzel.

### 2.4 LAVATORY

- A. Vitreous-China Lavatory: countertop and wall hung.
1. Manufacturers: One of the following:
  2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
    - a. American Standard Companies, Inc.
    - b. Eljer.
    - c. Kohler Co.
    - d. American Standard Companies, Inc.
    - e. Briggs Plumbing Products, Inc.
    - f. Crane Plumbing, L.L.C./Fiat Products.
    - g. Gerber Plumbing Fixtures LLC.
    - h. Kohler Co.
    - i. Mansfield Plumbing Products
    - j. Sterling Plumbing Group, Inc.
    - k. TOTO USA, Inc.
- B. Faucets: ASME A112.18.1; solid brass.

1. Manufacturers: One of the following:
2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
  - a. American Standard Companies, Inc.
  - b. Delta Faucet Company.
  - c. Elkay Manufacturing Co.
  - d. Moen, Inc.
  - e. Zurn Plumbing Products Group; Commercial Brass Operation.
  - f. Gerber Plumbing Fixtures LLC.
  - g. Sterling Plumbing Group, Inc.
  - h. Zurn Plumbing Products Group; Wilkins Operation.
  - i. Price Pfister, Inc.
3. Type: Center set with inlets on 4-inch centers and with pop-up waste.
4. Finish: Brushed nickel.
5. Handle(s): Dual lever Single-lever toggle Single, push-pull and twist.
6. Maximum Flow Rate: 2.2 gpm.

C. Drain Pop up with NPS 1-1/4 tailpiece, included with faucet.

D. Trap: Chrome-plated, and plastic tubular fittings with slip-joint inlet and wall flange.

E. Supply and Drain Insulation: Soft-plastic covering; removable at stops.

F. Fixture Support: Concealed arm for wall-mounting, lavatory-type fixture. Include rectangular steel uprights and feet.

## 2.5 BATHTUB

A. Bathtub: With slip-resistant bathing surface,

1. Manufacturers: One of the following:
2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
  - a. Eljer.
  - b. Kohler Co.
  - c. American Standard Companies, Inc.
  - d. Briggs Plumbing Products, Inc.
  - e. Crane Plumbing, L.L.C./Fiat Products.
  - f. Florestone Products Co., Inc.
  - ~~g.~~ Sterling Plumbing Group, Inc.
  - ~~h.~~ Aquatic Plumbing Fixtures.

B. Mixing-Valve Faucet and Miscellaneous Fittings: Single-lever, pressure-balance antiscald-type faucet; maximum 2.5 gpm flow rate.

1. Manufacturers: One of the following:

2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
  - a. American Standard Companies, Inc.
  - b. Delta Faucet Company.
  - c. Eljer.
  - d. Gerber Plumbing Fixtures LLC.
  - e. Kohler Co.
  - f. Moen, Inc.
  - g. Sterling Plumbing Group, Inc.
  - h. Symmons Industries, Inc.
  - i. Mainline Plumbing Fixtures.
3. Include tub filler spout; lever-operated, pop-up waste and overflow; shower diverter valve; shower head, arm, and flange; and ball, gate, or globe valves on supplies if check stops are not included with faucet.
4. Body Material: Solid brass.
5. Finish: Brushed nickel.
6. Shower Arm, Flow-Control Fitting: 1.6 gpm maximum.

## 2.6 SINK

- A. Stainless -Steel Sink: Counter-mounting, self-rimming type, two bowl(s).
  1. Manufacturers: One of the following:
  2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
    - a. Elkay Manufacturing Co.
    - b. Just Manufacturing Company.
    - c. Kohler Co.
    - d. American Standard Companies, Inc.
    - e. Dayton Plumbing Fixtures by Elkay.
- B. Faucet: Solid brass. Maximum 2.5-gpm flow rate.
  1. Manufacturers: One of the following:
  2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
    - a. American Standard Companies, Inc.
    - b. Delta Faucet Company.
    - c. Elkay Manufacturing Co.
    - d. Just Manufacturing Company.
    - e. Kohler Co.
    - f. Moen, Inc.
    - g. Zurn Plumbing Products Group; Commercial Brass Operation.
  3. Type: Widespread with inlets on 8-inch centers, with spray.
  4. Finish: Brushed nickel.

5. Handle(s): Single-lever toggle
6. Spout: Integral with body Swing with aerator 2-gpm laminar flow.

## 2.7 DRINKING FOUNTAIN

- A. Wall-hanging bi-level wheelchair-accessible type.
  1. Manufacturers: One of the following:
  2. Basis-of-Design Product: Product indicated on Drawings or a comparable product of one of the following:
    - a. Elkay Manufacturing Co.
    - b. Halsey Taylor.
    - c. Haws Corporation.

## PART 3 - EXECUTION

### 3.1 INSTALLATIONS

- A. Install fitting insulation kits on fixtures for people with disabilities.
- B. Install fixtures with flanges and gasket seals.
- C. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- D. Fasten wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated.
- E. Fasten floor-mounted fixtures to substrate. Fasten fixtures having holes for securing fixture to wall construction, to reinforcement built into walls.
- F. Fasten wall-mounted fittings to reinforcement built into walls.
- G. Fasten counter-mounting plumbing fixtures to casework.
- H. Secure supplies to supports or substrate within pipe space behind fixture.
- I. Set shower receptors and mop basins in leveling bed of cement grout.
- J. Install individual supply inlets, supply stops, supply risers, and tubular brass traps with cleanouts at fixture.
- K. Install water-supply stop valves in accessible locations.
- L. Install traps on fixture outlets. Omit traps on fixtures having integral traps. Omit traps on indirect wastes unless otherwise indicated.

- M. Install disposers in sink outlets. Install switch where indicated, or in wall adjacent to sink if location is not indicated.
- N. Install dishwasher and connect inlet hose to dishwasher and outlet hose to disposer.
- O. Install escutcheons at wall, floor, and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons where required to conceal protruding pipe fittings.
- P. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color.
- Q. Install piping connections between plumbing fixtures and piping systems and plumbing equipment. Install insulation on supplies and drains of fixtures for people with disabilities.
- R. Ground equipment.

END OF SECTION 224000

## SECTION 230500 - COMMON WORK RESULTS FOR HVAC

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

##### A. Hangers and Supports for Plumbing Piping Equipment:

1. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  - a. Design supports for multiple pipes capable of supporting combined weight of supported systems, and system contents.
  - b. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

#### 2.2 SLEEVES AND SLEEVE SEALS

- A. Galvanized-Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. PVC Pipe: ASTM D 1785, Schedule 40.

#### 2.3 ESCUTCHEONS AND FLOOR PLATES

- A. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
- C. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

#### 2.4 HANGERS AND SUPPORTS FOR HVAC

- A. Carbon-Steel Pipe Hangers and Supports:



1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of plastic or copper-coated steel

C. Fastener Systems:

1. Verify suitability of fasteners in this article for use in lightweight concrete or concrete slabs less than 4 inches thick.
2. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
3. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## PART 3 - EXECUTION

### 3.1 GENERAL PIPING INSTALLATIONS

- A. Install piping free of sags and bends.
- B. Install fittings for changes in direction and branch connections.
- C. Sleeves:
  1. Install sleeves in concrete floors as new slabs are constructed.
    - a. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
  2. Install stack-sleeve fittings in new slabs as slabs are constructed.
  3. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078446 "Penetration Firestopping."
- D. Sleeve-Seal-System Installation:
  1. Install sleeve-seal systems in sleeves in slabs-on-grade at service piping entries into building.

2. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

E. Escutcheons & Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.
4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

F. Install unions at final connection to each piece of equipment.

G. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

H. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

### 3.2 HANGERS AND SUPPORTS

- A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.
- B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.
- C. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

### 3.3 GENERAL EQUIPMENT INSTALLATIONS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

VEVE AT ARBOR GREEN APARTMENTS  
ALACHUA COUNTY, FLORIDA  
FK PROJECT NO. 5479

ISSUE FOR BID  
09/11/2018

END OF SECTION 230500

## SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Certified TAB reports.
2. Documentation of work performed per ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
3. Documentation of work performed per the Florida Building Code, Energy, Section R403.2.2, "Duct Sealing"

B. TAB Firm Qualifications: AABC, NEBB or TABB certified.

C. TAB Report Forms: Standard TAB contractor's forms approved by Architect.

#### 1.2 SCOPE

- A. Provide a pre-emptive air balance report for one living unit of each type per the HVAC general notes on the drawings (Sheet H6.01).
- B. Provide full test and balance for the clubhouse split systems and fans.
- C. Provide duct leakage tests per the Florida Building Code, Energy, Section R403.2. for the living units.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine the approved submittals for HVAC systems and equipment.
- C. Examine systems for installed balancing devices, such as manual volume dampers. Verify that locations of these balancing devices are accessible.
- D. Examine HVAC equipment and filters and verify that bearings are greased and equipment with functioning controls is ready for operation.

- E. Examine automatic temperature system components to verify the following:
  - 1. Dampers and other controlled devices are operated by the intended controller.
  - 2. Dampers are in the position indicated by the controller.
  - 3. Integrity of dampers and valves for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
  - 4. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
  - 5. Sequence of operation for control modes is according to the Contract Documents.
  - 6. Interlocked systems are operating.
  - 7. Changeover from heating to cooling mode occurs.
- F. Report deficiencies discovered before and during performance of test and balance procedures.

### 3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish.
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- B. Check for airflow blockages.
- C. Check condensate drains for proper connections and functioning.
- D. Check for proper sealing of air-handling unit components.
- E. Check for proper sealing of air duct system.

3.4 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent, except where indicated on drawings otherwise.
  2. Air Outlets and Inlets: Plus or minus 10 percent.

END OF SECTION 230593

## SECTION 230700 - HVAC INSULATION

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals:
  - 1. Product Data: For each type of product indicated.
  - 2. For adhesives and sealants, documentation including printed statement of VOC content.
- B. Quality Assurance: Labeled with maximum flame-spread index of 25 and maximum smoke-developed index of 50 according to ASTM E 84.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics:
  - 1. Indoor Insulation and related materials: To be factory labeled designating maximum flame-spread index of 25 or less, and smoke-developed index of 50 or less according to ASTM E 84.
  - 2. Outdoor Insulation and related materials: To be factory labeled designating maximum flame-spread index of 75 or less, and smoke-developed index of 150 or less according to ASTM E 84.

#### 2.2 INSULATION MATERIALS

- A. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
- C. Fiberglass Blanket Insulation: Comply with ASTM C 553, Type II and ASTM C 1290, Type I.
- D. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services; comply with MIL-PRF-19565C, Type II.
  1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

### PART 3 - EXECUTION

#### 3.1 INSULATION INSTALLATION

- A. Comply with requirements of the Midwest Insulation Contractors Association's "National Commercial & Industrial Insulation Standards" for insulation installation on pipes and equipment.
- B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- C. Insulation Installation at Fire-Rated Wall, Partition, and Floor Penetrations: Install insulation continuously through penetrations. Seal penetrations. Comply with requirements in Section 078413 "Penetration Firestopping."
- D. Flexible Elastomeric Insulation Installation:
  1. Seal longitudinal seams and end joints with adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
  2. Insulation Installation on Pipe Fittings and Elbows: Install mitered sections of pipe insulation. Secure insulation materials and seal seams with adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- E. Fiberglass Insulation Installation:
  1. Blanket and Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
  2. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier.
- F. Plenums and Ducts Requiring Insulation:
  1. Outside air ducts except where in attics or outside.
  2. Return and supply ducts in attic or outside.



3.2 DUCT AND PLENUM INSULATION SCHEDULE

- A. Duct insulation shall be Fiberglass – see general notes on sheet H6.01 for R-value.

3.3 HVAC PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping: Insulation shall be Flexible Elastomeric: Thickness to R-3 minimum.

END OF SECTION 230700

## SECTION 232300 - REFRIGERANT PIPING

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME B31.5, "Refrigerant Piping," and with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

#### 2.2 TUBES AND FITTINGS

- A. Copper Tube: ASTM B 88, Types K and L and ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings and Unions: ASME B16.22.
- C. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- D. Brazing Filler Metals: AWS A5.8.

#### 2.3 VALVES AND SPECIALTIES

- A. Thermostatic Expansion Valve: Comply with ARI 750; forged brass or steel body, stainless-steel internal parts, copper tubing
- B. Solenoid Valves: Comply with ARI 760; 240 deg F temperature rating, 400-psig working pressure, 240 deg F operating temperature; and 24-V normally closed holding coil.
- C. Strainers: Welded steel with corrosion-resistant coating and 100-mesh stainless-steel screen with socket ends; 500-psig working pressure and 275 deg F working temperature.
- D. Moisture/Liquid Indicators: 500-psig operating pressure, 240 deg F operating temperature; with replaceable, polished, optical viewing window and color-coded moisture indicator.
- E. Filter Dryers: 500-psig operating pressure; 240 deg operating temperature

- F. Refrigerant: ASHRAE 34, R-410A.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Comply with requirements in Section 230500 "Common Work Results for HVAC" for basic piping installation requirements.
- B. Install wall penetration system at each pipe penetration through exterior wall. Make installation watertight. Comply with requirements in Section 230500 "Common Work Results for HVAC" for wall penetration systems.
- C. Install refrigerant piping and charge with refrigerant according to ASHRAE 15.
- D. Insulate suction lines to comply with Section 230700 "HVAC Insulation."
- E. Install strainers upstream from compressors unless they are furnished as an integral assembly for device being protected:
- F. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

#### 3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Copper, Type ACR, Type K annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

END OF SECTION 232300

## SECTION 233100 - HVAC DUCTS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.
2. For adhesives and sealants, documentation including printed statement of VOC content.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."
- E. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
- F. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- G. Comply with UL 181 for ducts and closures.

#### 2.2 DUCTS

- A. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip galvanized coating.
  1. Galvanized Coating Designation: G60.
  2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- B. Fibrous-Glass Duct Board: Comply with UL 181, Class 1, fibrous glass with fire-resistant, reinforced foil-scrim-kraft barrier, and having the air-side surface treated to prevent erosion. See general notes on sheet H6.01 for required R-value.

- C. Joint and Seam Tape, and Sealant: Comply with UL 181A.
- D. Rectangular Metal Duct Fabrication: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- E. Fibrous-Glass Duct Fabrication: Comply with SMACNA's "Fibrous Glass Duct Construction Standard."
- F. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.
  - 1. R-value – see general notes on sheet H6.01
  - 2. Airstream surface coated with an antimicrobial erosion-resistant coating.
  - 3. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
  - 4. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment.

## 2.3 ACCESSORIES

- A. Volume Dampers and Control Dampers: Single-blade and multiple opposed-blade dampers, standard leakage rating, and suitable for horizontal or vertical applications; factory fabricated and complete with required hardware and accessories.
- B. Fire Dampers: Rated and labeled according to UL 555 by an NRTL; factory fabricated and complete with required hardware and accessories.
- C. Ceiling Radiation Dampers: Labeled according to UL 555C by an NRTL and complying with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire Resistance Directory." Provide factory-fabricated units complete with required hardware and accessories.
- D. Flexible Connectors: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.
- E. Flexible Ducts: Spiral-wound steel spring with flameproof vinyl sheathing, Factory-fabricated, insulated, round duct, with an outer jacket enclosing thick, glass-fiber insulation around a continuous inner liner complying with UL 181, Class 1.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Outdoor, Supply-Air Ducts: Seal Class A.
  2. Outdoor, Exhaust Ducts: Seal Class C.
  3. Outdoor, Return-Air Ducts: Seal Class C.
  4. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
  5. Unconditioned Space, Exhaust Ducts: Seal Class C.
  6. Unconditioned Space, Return-Air Ducts: Seal Class B.
  7. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
  8. Conditioned Space, Exhaust Ducts: Seal Class B.
  9. Conditioned Space, Return-Air Ducts: Seal Class C.
- C. Conceal ducts from view in finished and occupied spaces.
- D. Avoid passing through electrical equipment spaces and enclosures.
- E. Support ducts to comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Hangers and Supports."
- F. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- G. Install volume and control dampers in lined duct with methods to avoid damage to liner and to avoid erosion of duct liner.
- H. Install fire and radiation dampers according to UL listing.
- I. Install fusible links in fire dampers.
- 3.2 TESTING, ADJUSTING, AND BALANCING
- A. See section 230593

END OF SECTION 233100

## SECTION 233423 - HVAC POWER VENTILATORS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Products shall be licensed to use the AMCA-Certified Ratings Seal.
- B. Power ventilators shall comply with UL 705.
- 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 CEILING AND WALL MOUNTED VENTILATORS

##### A. Manufacturers: One of the following:

1. Acme Engineering & Manufacturing Corporation.
2. Aerovent; a division of Twin City Fan Companies, Ltd.
3. Panasonic
4. Air King
5. Broan-NuTone LLC.
6. Broan-NuTone LLC; NuTone Inc.
7. Carnes Company.
8. Central Blower Company.
9. Delhi Industries Inc.
10. Greenheck Fan Corporation.
11. Fan Tech
12. JencoFan.
13. Loren Cook Company.
14. PennBarry.
15. Quietaire Inc.
16. W.W. Grainger, Inc.; Dayton Products.

- B. Housing: Steel, lined with acoustical insulation.

- C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- D. Grille: louvered or egg-crate grille with flange on intake and thumbscrew attachment to fan housing.
- E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

## 2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
- B. Enclosure Type: Totally enclosed, fan cooled.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install units with clearances for service and maintenance.
- B. Ceiling-Mounted Units: Suspend units from structure using steel wire or metal straps.
- C. Ground power ventilators.

END OF SECTION 233423



## SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: For each type of product indicated, including color charts for factory finishes.

### PART 2 - PRODUCTS

#### 2.1 OUTLETS AND INLETS

##### A. Diffusers, registers and grilles

1. Manufacturers: One of the following:
  - a. Anemostat Products; a Mestek company.
  - b. Hart & Cooley Inc.
  - c. METALAIRE, Inc.
  - d. Nailor Industries Inc.
  - e. Price Industries.
  - f. Titus.
  - g. Tuttle & Bailey.
  - h. A-J Manufacturing Co., Inc.
  - i. Us Aire

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Make final locations where indicated, as much as practical. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

END OF SECTION 233713

## SECTION 236200 - PACKAGED COMPRESSOR AND CONDENSER UNITS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals:
  - 1. Product Data: For each type of product indicated.
  - 2. Documentation indicating matched efficiencies with AHU's
- B. Warranties: Submit a written warranty, signed by manufacturer, agreeing to repair or replace components that fail within five years after Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Verify performance according to ARI 210/240.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with ASHRAE 15.

#### 2.2 AIR-COOLED CONDENSING UNITS 1 TO 5 TONS

- A. Description: Factory assembled and tested, air cooled; consisting of compressors, condenser coils, fans, motors, refrigerant reservoirs, and operating controls.
  - 1. Manufacturers: One of the following:
    - a. Carrier Corporation; Commercial HVAC Systems.
    - b. Lennox International Inc.
    - c. Rheem Air Conditioning Division.
    - d. Ruud Air Conditioning Division.
    - e. Trane; a business of American Standard Companies.
    - f. YORK; a Johnson Controls company.
    - g. Goodman
  - 2. Compressor: Hermetically sealed and isolated for vibration. Include thermal-, current-, and temperature-sensitive overload devices, start capacitor, relay, and contactor.
  - 3. Refrigerant Charge: R-410A.
  - 4. Condenser Coil: Copper-tube, aluminum-fin coil, with liquid subcooler.

5. Condenser Fan: Direct-drive, aluminum propeller fan; with permanently lubricated motor with thermal-overload protection.
6. Accessories: Include the following:
  - a. Valves for service and charging.
  - b. High- and low-pressure safety switches.
  - c. Low-ambient kit to permit operation down to 40 deg F Crankcase heater.
  - d. Automatic reset timer to prevent compressor rapid cycle.
  - e. Reversing valve if heat pump is called for.
  - f. Defrost control sequence if heat pump is called for.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install units level and plumb. Maintain recommended clearances.

END OF SECTION 236200

## SECTION 238219 – AIR HANDLING UNITS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: Include rated capacities, operating characteristics, furnished specialties, accessories, and color charts for cabinet finishes.

- ##### B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fail in materials or workmanship within five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 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.

#### 2.2 FACTORY-ASSEMBLED UNITS

##### A. Manufacturers: One of the following:

1. Airtherm; a Mestek company.
2. Carrier Corporation.
3. Engineered Air Ltd.
4. Environmental Technologies, Inc.
5. First Co.
6. International Environmental Corporation.
7. Marlo Coil; Subsidiary of Engineered Support Systems, Inc.
8. Marshall Engineered Products Co., LLC (MEPCO); Dunham-Bush, Inc.
9. McQuay International.
10. Rosemex.
11. Trane.
12. USA Coil & Air.
13. YORK International Corporation.
14. Goodman

- ##### B. Description: Factory-packaged and -tested units rated according to ARI 440, ASHRAE 33, and UL 1995.

- C. Coil Section Insulation: 1/2-inch thick, coated glass fiber or foil-covered, closed-cell foam complying with ASTM C 1071 and attached with adhesive complying with ASTM C 916.
  - 1. Fire-Hazard Classification: Insulation and adhesive shall have a combined maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
  - 2. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- D. Main and Auxiliary Drain Pans: Plastic or insulated galvanized steel with plastic liner formed to slope from all directions to the drain connection as required by ASHRAE 62.1.
- E. Chassis: Galvanized steel where exposed to moisture.
- F. Cabinet: Steel
  - 1. Vertical Unit Front Panels (on selected units): Removable, steel, with discharge grille and channel-formed edges, cam fasteners, and insulation on back of panel.
  - 2. Steel recessing flanges for recessing fan-coil units into ceiling or wall.
- G. Electric-Resistance Heating Coils: Nickel-chromium heating wire, free of expansion noise and hum, mounted in ceramic inserts in galvanized-steel housing; with fuses in terminal box for overcurrent protection and limit controls for high-temperature protection. Terminate elements in stainless-steel machine-staked terminals secured with stainless-steel hardware.
- H. Hydronic heating coil: Rated for potable water
- I. Accessories:
  - 1. Permanently lubricated, multispeed motor, resiliently mounted on motor board.
  - 2. Steel recessing flanges for recessing AHU's into wall (on selected units).
- J. Basic Unit Controls: See drawings

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install AHU's to comply with NFPA 90A.
- B. Install units level and plumb and firmly anchored.
- C. Connect units to wiring systems and to ground.

END OF SECTION 238219

## SECTION 238239 - UNIT HEATERS

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

##### A. Submittals:

1. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.

- ##### B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit heaters that fail in materials or workmanship within **five** years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 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.

#### 2.2 CABINET UNIT HEATERS

##### A. Manufacturers: One of the following:

1. Airtherm; a Mestek company.
2. Berko Electric Heating; a division of Marley Engineered Products.
3. Carrier Corporation.
4. Chromalox, Inc.; a division of Emerson Electric Company.
5. Dunham-Bush, Inc.
6. Engineered Air Ltd.
7. Indeco.
8. International Environmental Corporation.
9. Markel Products; a division of TPI Corporation.
10. Marley Electric Heating; a division of Marley Engineered Products.
11. McQuay International.
12. Ouellet Canada Inc.
13. QMark Electric Heating; a division of Marley Engineered Products.
14. Rosemex Products.
15. Trane.
16. USA Coil & Air.

- B. Factory-assembled and -tested units complying with ARI 440, with electric-resistance heating coil, direct-drive centrifugal fans, steel cabinet, and adjustable discharge grilles.
- C. Cabinet Finish: Phosphatized, primed, and with baked-enamel finish in color selected.

### 2.3 PROPELLER UNIT HEATERS

- A. Manufacturers: One of the following:
  - 1. Airtherm; a Mestek company.
  - 2. Engineered Air Ltd.
  - 3. McQuay International.
  - 4. Rosemex Products.
  - 5. Ruffneck Heaters; a division of Lexa Corporation.
  - 6. Trane.
  - 7. Qmark Electric Heating; a division of Marley Engineered Products.
- B. Description: An assembly including casing, coil, fan, and motor and adjustable louvers.
  - 1. Comply with UL 2021.
- C. Cabinet Finish: Phosphatized, primed, and with baked-enamel finish in color selected.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install unit heaters to comply with NFPA 90A.
- B. Install unit level and plumb and firmly anchored.
- C. Connect units to wiring systems and to ground.

END OF SECTION 238239

## SECTION 260000 – GENERAL ELECTRICAL PROVISIONS

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. Provide all labor, material and equipment for a complete and operating electrical system.
- B. Codes and Standards: All electrical work shall be in strict compliance with OSHA requirements, the 2017 National Electrical Code, the local County electrical code and Power Company standards. All materials shall be new and free from defects and shall bear the Underwriters' label for its intended use. Work under this section shall conform to all governing codes, ordinances and regulations of the City, County and State. Wherever code requirements exceed the work indicated on the contract drawings, the code shall govern. Wherever contract documents exceed code, the documents shall govern.
- C. Permits, Fees and Notices: Secure and pay for all required by the work of this Division. Provide final inspection certificate(s) as applicable.
- D. Contractor shall thoroughly investigate site before bidding. No changes will be allowed in contract price for work required to comply with existing conditions.
- E. Workmanship shall meet N.E.C.A. guidelines.
- F. If, through errors or omissions, the intent of Architect/Engineer with regard to any detail is not clear, or is capable of more than one interpretation, such matters must be brought to the attention of the Architect/Engineer in writing before the submission of bids, and the Architect/Engineer shall make correction or explanation in writing. Otherwise, no extra charge will be allowed for the work or material which the Architect/Engineer will require, provided that it comes within a reasonable interpretation of the Drawings and Specifications.
- G. The plans and specifications are intended as a general description of the work to be performed. All items not specifically mentioned or shown, but necessary for the completion of the installation, shall be furnished and installed by this Contractor. This Contractor shall thoroughly acquaint himself with the Mechanical, Architectural, Structural and Electrical plans before submitting his final bid. No additional compensation will be allowed due to the Contractor's failure to familiarize himself with the plans.

#### 1.2 SUBMITTALS

- A. Provide submittals of technical information on all major equipment in binders. Mark up prints of the design drawings with red pencil as items are installed and provide copy showing an accurate "As-Built" record of the entire system. Give the Owner instructions in operation of the system. Secure from the Owner a signed memo stating that technical information, as-built drawings and instructions in operation have been received. Submit memo to the Architect.



## PART 2 - PRODUCTS

### 2.1 CONDUIT

- A. All wires shall be concealed in conduit, (1/2" min.) including grounding wires. When conduit is located below slab on grade or underground, it shall be PVC Schedule 40 (3/4" min.). Provide all empty conduits with pullwires. EMT and MC Cable may be used where permitted by code. Conduits shall be sized per N.E.C.

### 2.2 CONDUCTORS

- A. All conductors shall be copper (#14 min) THHN/THWN insulation. Comply with the N.E.C. Articles 300 and 310. All conductors shall be new, free from kinks and other defects when installed. Where local authorities permit, aluminum conductors may be used for service entrance and panel feeders as indicated on riser diagrams.
- B. NM cable may be used instead of wire in conduit for all branch circuits within the living units where permitted by local authorities.
- C. SER cable may be used instead of wire in conduit for tenant panel feeders from the meter center where permitted by local authorities.

### 2.3 SUPPORTS

- A. Provide all supports for material and equipment.

### 2.4 COVER PLATES

- A. All plates shall be white plastic.

### 2.5 RECEPTACLES

- A. Provide standard grade 15 amp, 2 pole, 3 wire, tamper resistant with back and side wiring capability and suitable for split circuit operation in tenant units. Provide 20 amp receptacles in all non-tenant unit areas.
- B. Ground Fault Interrupter: Provide "specification grade" duplex receptacles, ground fault circuit interrupters (GFI), feed-thru type, capable of protecting connected downstream receptacles on single circuit, grounding type UL rated Class A, 20 amps rating, 120 volts, with solid state ground fault sensing and signaling, 5 milliamperes ground fault trip level; and equip with local test/reset buttons.

## 2.6 SWITCHES

- A. Provide silent type standard grade 15 amp, 120V for all single pole, double pole, three-way and four-way switches.

## 2.7 LIGHTING FIXTURES

- A. Fixture schedule shows required type of fixture only. Determine modifications required to make fixtures suitable for ceilings as installed, and furnish fixtures adapted to the ceiling used. Fixtures shall be UL approved. This contractor shall protect the fixtures and lamps and shall replace broken parts. All lenses and louvers in any area shall be cleaned after all trades have completed their work in that area. Provide new lamps for all lighting fixtures.

## 2.8 METERING EQUIPMENT

- A. Multi-metering equipment shall be Square-D wall mounted EZ Meter-Pack or similar as manufactured by Eaton, G.E. or Siemens. All components shall have been tested and Underwriters Laboratories listed for use as an integral part of the multi-metering system. All metering equipment shall be listed on the Power Company's approved metering equipment list and shall be installed in strict accordance with their requirements.
- B. All components shall be factory assembled and all current-carrying parts shall be plated bus bars. Individual units shall be constructed with an integral sliding bolt assembly for a completely bussed meter center.
- C. The meter center shall be UL listed with an AIC rating equal to or greater than the available current at the meter center.

## 2.10 LOADCENTERS

- A. Shall be load centers Square-D Type Q0 or equal units manufactured by Eaton, G.E. or Siemens. Main ratings and branch circuit breaker ratings shall be of size and number as indicated on drawings. Load centers shall be plug-on type construction. All current carrying parts of the bus assembly shall be plated. Terminals for feeder conductors to mains and branch neutral shall be UL listed as suitable for the type of conductor specified. The load center bus assembly shall be enclosed in a steel cabinet. The size of the wiring gutters and gauge steel shall be in accordance with UL Standards No. 67 and 50. Fronts shall include door and be provided with a directory for circuit identification (typewritten). Load center boxes and fronts shall have corrosion resisting phosphate treatment and baked-enamel finish. Loadcenters shall be UL listed and meet Federal Specification WP-115A as Type 1, Class 2.
- B. Branch circuit breakers up to 150 amps shall be Square-D Type Q0, Q1, or approved equal. All breakers shall be plug-on type, toggle action with quick-make, quick-break mechanism. All multi-pole breakers shall be single-operating handle, common-trip variety. Circuit breakers shall be UL listed and meet the requirements of Federal Specification WC-375B, Class 1.

## 2.11 SERVICE ENTRANCE EQUIPMENT

- A. Obtain installation requirements from power company and be governed accordingly. Coordinate locations of stub ups and routing prior to installation. Relocate equipment improperly installed due to lack of coordination at no additional cost.
- C. Surge Arresters: Furnish and install main secondary service surge arresters on line side of the main switch. Arrester shall be 3-pole, with 650 volts maximum rating. Arrester shall permit a maximum discharge voltage of 2.2KV at a 1.5KA current level. Unit shall be sealed in an extruded aluminum housing, complete with 18 inch copper wire leads and mounting bracket. Arrester shall be Joslyn No. J9200-9 or approved equal.
- D. Grounding System: At incoming service and separately derived service locations, provide 5/8" x 10' copper clad ground rods with grounding electrode conductor sized in accordance with NEC Table 250-66 to achieve a maximum resistance of 25 OHMS. Bond to incoming metallic water supply.

## 2.12 DISCONNECT SWITCHES

- A. Shall be general duty safety switches with 100,000A short circuit rating, and shall be listed in accordance with UL 98. The cover shall be interlocked so that the door cannot be opened with the handle in the "on" position, except by the intentional operation of a concealed release (defeater) mechanism. Provide fusible switch for A/C units as per UL listing and local code requirements. Provide dual element, time delay fuses in all fusible switches.

## 2.13 ELECTRIC MOTOR AND EQUIPMENT WIRING

- A. Provide a complete branch circuit wiring, starter and disconnect switch for all motor driven equipment. When motor driven equipment is provided with a "package" control panel which includes starter, this contractor will not provide starter. Motor connections shall be made with flexible conduit. Provide an overload element in each phase.

## 2.14 TELEPHONE PREWIRING

- A. Provide all necessary wiring, boxes, and related accessories required by local telephone company for complete prewired unit installation of telephone service to telephone company interface.

## 2.15 TELEVISION RECEPTION PREWIRING

- A. Provide all necessary wiring, boxes, and related accessories required for complete prewired installation of television reception service to each unit.

2.16 RESIDENTIAL UNIT SMOKE DETECTORS

- A. Shall be photo-electric type with local alarm suitable for 120VAC operation. Smoke detectors shall be interconnected so that activation of a single detector shall alarm all detectors within that living unit. All smoke detectors shall have battery back-up feature.

2.17 RESIDENTIAL UNIT CARBON MONOXIDE DETECTORS

- A. Shall be suitable for 120VAC operation with battery back up and a local, distinct audible alarm. Detectors shall be interconnected so that activation of a single detector shall alarm all other detectors within that living unit.
- B. Detectors shall be listed and labeled to comply with ANSI/UL 2034-96, Standard for Single and Multiple Station CO Alarms.

2.18 Fire Alarm System

- A. Fire alarm system and its components and system operations shall also meet the approval of the local fire department.
- B. Functions:
  - 1. Upon actuation of any manual alarm station or automatic alarm initiating device they shall illuminate the zone LED at the control panel and remote annunciators.
    - a. Operate all audible and visual alarm signals.
    - b. Audible devices must notify building occupants in accordance with ANSI S3.41, "Audible Emergency Evacuation Signal".
    - c. Have provisions to transmit fire alarm signal to the local fire department via telephone lines.
  - 2. It shall be possible to silence the alarm signals before operating the reset switch by depressing the signal silence switch. However, with the signals silenced subsequent zone alarms will respond to the signals.
  - 3. Power failure, opens, grounds or any disarrangement of system wiring or components shall be indicated by a visual and audible trouble signal at remote annunciators and the fire control panel. The trouble signal may be silenced, but the trouble light must remain illuminated until the system has been returned to normal, at which time the trouble signal shall resound until the trouble silence switch has been returned to the normal position.

C. Equipment:

- 1. Fire alarm annunciator panel and control panels shall be located as indicated on the

- drawings.
2. Provide a minimum of one zone for each floor. Provide additional zones as required for fire protection tamper and flow switches.
  3. Fire alarm horn/light units shall be surface mounted with red finish or stainless steel trim. Light lens shall be silk screened with the word "FIRE" in red lettering.
  4. Strobe lights shall be rated at 75 cd minimum in all public spaces and 177 cd in sleeping rooms.
  5. Pull stations shall be non-coded, manually operated, single action with break glass rod. Provide weatherproof covers for all pullstations exposed to rain.
  6. Residential unit horns shall be flush mounted in a single gang box with a red finish.
  7. Provide an approved digital communicator to transmit the fire alarm and supervisory signals to a central station. The digital communicator shall be UL and FM listed for fire reporting to a central station and shall conform to the requirements to NFPA 71.
  8. Fire Alarm Systems wiring: alarm initiating circuits shall be 16 AWG stranded or larger, with 7 strands (maximum), or 14 AWG solid. Alarm indicating circuits shall be 14 AWG solid or larger. Install per manufacturer's wiring diagrams.
  9. Provide surge protection on all FACP power circuits and all communications lines between buildings as recommended by the equipment manufacturer.

### PART 3 - EXECUTION

#### 3.1 APPARATUS IDENTIFICATION

- A. Panelboard, circuit breakers in panelboards, motor disconnect switches, starters, and other apparatus used for the operation or control of, circuits, appliances or equipment shall be properly identified by means of engraved laminated plastic descriptive nameplates mounted on the apparatus using contact cement. Cardholders in any form are acceptable in the living units.

#### 3.2 GROUNDING

- A. A separate grounding conductor, sized in accordance with NEC Table 250-95 shall be provided in the conduit with the circuit conductors for all lighting, power and feeder circuits.
- B. All electrical equipment enclosures and conductor enclosures shall be grounded.

#### 3.3 INSTALLATION

- A. The Contractor shall adapt his work to job conditions and make such changes as required and permitted by the Architect, such as moving his work to clear beams, joists, and adjusting his risers or other apparatus to avoid interferences with windows and openings: or raising or lowering his work to permit the passing of ductwork or the work of other trade: all as required or as job conditions dictate, without any additional costs to the Owner.
- B. Examine areas and conditions under which work is to be performed and products are to be

installed and notify General Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- C. Do not allow or cause any of the work of this division or cause other divisions of work to be covered up or enclosed until it has been inspected, tested and approved by the Architect and by all other authorities having jurisdiction.
- D. All switchboards, panelboards, transformers, switches, outlets, coverplates, signs, lighting fixtures, and any and all other electrical equipment provided shall be thoroughly cleaned of all dirt, oil, concrete, etc. Any dents, scratches or other visible blemishes shall be corrected and the appearance and corrosion resistance of the equipment made "like new", to the satisfaction for the Architect/Engineer.
- E. Perform all adjustments necessary to ensure proper system operation in accordance with manufacturer written instructions.

END OF SECTION 260000

## SECTION 263212 - EMERGENCY GENERATOR

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. Provide a complete and operable generator set as indicated on the drawings and as required by this section.

#### 1.2 SUBMITTALS

- A. Submit signed statement on product suppliers company letterhead indicating that products submitted will comply with the "2.02 Set Performance" portion of this specification section.
- B. Submit manufacturer's product specification sheets on the entire set and all auxiliary equipment and accessories.
- C. If modifications or deviations to these contract documents are required, submit copy of the documents affected showing all proposed changes.

### PART 2 – PRODUCTS

#### 2.1 GENERAL

- A. All generator sets shall be the product of one manufacturer, and shall be Level 1, Type 10, Class X.
- B. Generator set shall be rated for continuous duty under full load conditions in a minimum ambient temperature range of 0 to 120F.
- C. All components constructed of corrodible material shall have an effective coating or treatment to prevent corrosion.
- D. All terminals for field connection of wiring shall be factory numbered, color coded, or otherwise identified for ease of installation and maintenance.
- E. Provide fuel piping of compatible metal to minimize electrolysis. Galvanized fuel lines shall not be used. Provide approved flexible fuel lines between the engine and fuel lines.
- F. Provide portable fire extinguisher as specified in NFPA 10 of appropriate size, type and number for the generator set location.
- G. Generator set shall have been proven by prototype testing with all listed accessories which will affect the performance in place.

- H. Provide unit with remote emergency stop capability, complete with break glass stop station.
- I. Provide additional products not specifically mentioned herein as required for proper operation and where recommended by the product manufacturer.
- K. The entire generator set shall comply with all requirements of UL 2200 and NFPA 110.

## 2.2 SET PERFORMANCE

- A. Regulation of generator output voltage from no load to full load shall not exceed +2 percent of rated voltage.
- B. Regulation of generator output frequency under steady state conditions shall not exceed +0.5 percent of rated frequency.
- C. Upon a one-step application of 100 percent of rated KW, voltage drop shall not exceed 20 percent of rated voltage for no more than 1 second.
- D. Under any line to line or line to neutral short circuit condition, set shall produce 250 to 500 percent of rated current and 90 to 100 percent of rated voltage for at least 10 seconds.
- E. Harmonic distortion of output wave form under full load conditions shall not exceed 5 percent.

## 2.3 ENGINE

- A. Provide natural gas type engine with V or I cylinder configuration.
- B. Engine shall not exceed 1,800 RPM at normal full load operation.
- C. Provide mechanical or isochronous type speed governor as required to provide generator frequency regulation specified herein.
- D. Provide electric starter with positive shift solenoid.
- E. Provide pressure type lubrication system with gear driven pump and replaceable element filter(s) with spring loaded bypass valve(s). Splash type lubrication systems are not acceptable.
- F. Engine oil drain shall be factory piped to the side of the mounting base.
- G. Provide replaceable element type air and fuel filters.
- H. Provide with integral battery charger and voltage regulator.
- I. Engine shall be designed for satisfactory performance using the natural gas fuel composition provided by the gas utility company.



## 2.4 COOLING SYSTEM

- A. Provide closed loop liquid type system with unit mounted radiator and engine driven fan.
- B. Provide anti-freeze solution of the type and mixture ratio recommended by the engine manufacturer.
- C. Provide automatic controls to prevent engine from running if coolant level falls below a predetermined level.
- D. Provide immersion type engine coolant heater rated for 120 volt operation with wattage rating as recommended by the set manufacturer and automatic controls set to maintain coolant temperature at not less than 90 degrees F and to de-energize heater when engine is running.

## 2.5 EXHAUST SYSTEM

- A. All exhaust system components and flexible connection from engine to muffler shall be provided by Division 16.
- B. Provide seamless stainless steel flexible exhaust connection between engine exhaust outlet and muffler.
- C. Provide critical type muffler suitable for exterior installation.
- D. Provide T type condensate trap with drain cock between muffler and engine.
- E. Provide schedule 40 black iron exhaust pipe sections with threaded or flanged connections as required to complete exhaust system.
- F. Provide rain cap and bird screen on end of tailpipe.
- G. Flow capacity and backpressure values of system as installed shall comply with set manufacturers recommendations.

## 2.6 GENERATOR

- A. Provide brushless self-cooling rotating field type generator conforming to NEMA MG1-22 with 208/120 3 phase, 4 wire wye output as indicated on the drawings.
- B. Rotor shall have 4 pole configuration with full amortisseur windings, NEMA Class F insulation system, single sealed ball bearing, dynamic balancing to operate at 125 percent overspeed, and self-aligning flexible connection to engine flywheel.
- C. Stator shall be of 2/3 pitch design with NEMA Class F insulation system and 12 lead output.
- D. Exciter shall be the rotating brushless permanent magnet type with solid state transient suppressed full wave rectifier.

- E. Voltage regulator shall be the solid state type with ambient temperature compensation and minimum  $\pm 5$  percent adjustment range.
- F. Generator shall be of drip-proof construction and be fully guarded.
- G. The connection box for the termination of generator feeders shall meet the bending requirements and working clearances of the appropriate NEC sections.

## 2.7 MOUNTING BASE

- A. Engine and generator shall be factory mounted on a common base of sufficient rigidity to maintain satisfactory dynamic alignment of the rotating elements of the set.
- B. Provide spring or pad type vibration isolators between the engine/generator and the base or between the base and the housekeeping pad.

## 2.8 OVERCURRENT PROTECTION DEVICES

- A. Provide factory installed molded case circuit breaker with electrical characteristics as indicated on the drawings on generator output lines.
- B. Equip breaker with auxiliary dry contact, closed with breaker in the off and tripped positions, to operate visual indicator on set control panel.
- C. Equip breaker with device to padlock handle in the "off" position.

## 2.9 CONTROL PANEL

- A. Provide control panel on the set containing the following equipment and possessing the following characteristics:
  - 1. Generator output voltage meter.
  - 2. Generator output amperage meter.
  - 3. Generator output frequency meter.
  - 4. Phase selector switch for generator output meters.
  - 5. Oil pressure gauge to indicate engine lubricating oil pressure.
  - 6. Temperature gauge to indicate engine coolant temperature.
  - 7. Hour meter to indicate actual total engine running time.
  - 8. Panel-mounted control switch(es) marked "Run-Off-Automatic" to perform the following functions:
    - a. Run: Start and run engine.
    - b. Off: Stop engine or reset safeties or both.
    - c. Automatic: Allow engine to start by closing a remote contact and stop by opening the remote contact.
  - 9. Individual visual indicators to annunciate the occurrence of each of the following conditions:
    - a. Engine overcrank.
    - b. Engine overspeed.

- c. Low engine coolant temperature.
  - d. High engine coolant temperature prealarm.
  - e. High engine coolant temperature.
  - f. Low engine oil pressure prealarm.
  - g. Low engine oil pressure.
  - h. Low voltage in battery unit.
  - i. Battery charger malfunctioning.
  - j. Engine starting switch not in automatic position.
  - k. Generator main breaker off.
  - l. EPS supply load.
10. Switch to test all visual indicators.
  11. Common audible alarm that will sound during any and all of the conditions listed in 2.09(A)(9) above.
  12. Additional contacts or circuits for remote alarm panel(s).
  13. Voltage adjust rheostat to allow +5 percent voltage adjustment.
- B. Provide an automatic control system to shut down and lock out engine due to the following conditions:
1. Engine overcrank.
  2. Engine overspeed.
  3. Low engine oil pressure.
  4. High engine coolant temperature.
  5. Operation of remote manual stop station.
- C. Provide an automatic control system to permit cyclic engine cranking and starter lockout in accordance with NFPA 110, 3-5A.
- D. All visual indicators and automatic control systems shall be powered by the battery unit used to start the engine.
- E. Instruments that display engine conditions shall be placed in such a location that will allow maintenance personnel to readily observe them without changing position from a logical maintenance work position at the set.
- F. Control panel shall be mounted by means of anti-shock vibration mountings.
- G. All wiring for connection to control panel shall be harnessed or flexibly enclosed, securely mounted to prevent chafing and vibration damage and shall terminate at the control panel in an enclosed box or panel.
- 2.10 REMOTE ALARM PANEL
- A. Provide remote panel consisting of individual visual alarms, common audible alarm, and audible alarm silencing switch.
- B. Individual visual alarms and common audible alarm shall activate during any and all of the conditions listed in 2.09 (A) 9. above.

- C. Panel shall include repetitive alarm circuitry so that, after the audible alarm is silenced, it will be reactivated after clearing the fault condition and must be restored to normal position to be silenced, or a manual alarm silencing means shall be permitted which silences the audible alarm after the occurrence of the alarm condition of such means do not inhibit any subsequent alarms from again sounding the audible alarm without further manual action.
- D. Panel shall be powered by the battery unit used to start the engine.

#### 2.11 BATTERY UNIT

- A. Provide lead acid routine maintenance type battery unit with capacity to provide 60 seconds of continuous cranking.
- B. Provide set manufacturer's standard set mounted rack and battery cable set.
- C. Provide blanket type battery heater(s) rated for 120 volt operation, with wattage rating as recommended by the set manufacturer and automatic controls to maintain battery electrolyte temperature at not less than 50 nor more than 90 degrees F and to de-energize heaters when engine is running.

#### 2.12 AUXILIARY BATTERY CHARGER

- A. Provide fully automatic dual rate type battery charger with automatic voltage regulator, 120VAC input, and output ratings as recommended by set manufacturer and battery unit manufacturer.
- B. Charger shall be capable of returning a fully discharged battery unit to a fully charged condition within 24 hours and without damaging the battery unit.
- C. Equip charger with dc voltmeter and ammeter having an accuracy within 5 percent of range to indicate the operation of the charger.
- D. Charger shall be permanently marked with the allowable range of battery unit capacity, nominal output current and voltage, and sufficient battery-type data so as to allow suitable replacement batteries to be secured.

### PART 3 - INSTALLATION

#### 3.1 INSTALLATION

- A. Install all system conductors in conduit, or other type of raceway where indicated, unless specifically indicated otherwise.

- B. Install generator set as indicated and in accordance with manufacturer's written instructions, approved shop drawings, applicable code requirements, NECA "Standard of Installation" and recognized industry practice to ensure that system complies with requirements and serves the intended purpose.
- C. Provide low voltage signal and control circuits from set to transfer switches, main fuel tank sending units, remote alarm panel, fuel leaking sensing units and other remote mounted accessories, as indicated on the drawings and in accordance with all requirements of the set manufacturer and the remote accessories manufacturers.
- D. Coat the threaded portion of all exhaust system connections with an anti-seize compound during assembly.

### 3.2 CONCRETE FOUNDATIONS

- A. Provide two section foundation for generator set in accordance with set manufacturers recommendations. Pads shall be at least 6 inches thick and shall extend 6 inches beyond the set mounting base.

### 3.3 DEMONSTRATION AND TESTING

- A. With prime mover in a "cold start" condition and emergency load at normal operating level, initiate a normal power failure to the building or facility. Test load shall be the maximum load that is served by the EPSS.
  - 1. Observe and record the time delay on start for the generator(s).
  - 2. Observe and record the cranking time until the prime mover(s) starts and runs.
  - 3. Observe and record the time required to reach operating speed.
  - 4. Record voltage and frequency overshoot for the generator(s). Utilize appropriately sensitive meters.
  - 5. Observe and record time required to achieve steady-state condition with all switches transferred to the emergency position. Verify that each transfer switch has properly transferred.
  - 6. Record voltage, frequency and amperes for the generator(s). Record the data at first load acceptance and every 15 minutes thereafter until the completion of the two-hour test period.
  - 7. Record prime mover oil pressure, water temperature where applicable, and battery charge rate at 5-minute intervals for the first 15 minutes, and at 15-minute intervals thereafter.
  - 8. Continue load test for two hours observing and recording load changes and the resultant effect on voltage and frequency.
  - 9. Verify that all loads have transferred and are operating. Look for motor starters that are locked out and do not automatically restart. Check to see that elevators are re-energized within 60 seconds. Verify that no exhaust gases are entering facility.
  - 10. Return normal power to the building or facility, record the time delay on retransfer to normal for each switch (minimum setting: 5 minutes), and the time delay on prime mover cool down period and shutdown.
- B. After completion of the above test, the prime movers shall be allowed to cool for 5 minutes; after which, the following full load test shall be performed:

1. Full Load Test: A load shall be applied for a two-hour, full load test. The building load can serve as part or all of the load, supplemented by a load bank of sufficient size to provide a load equal to 100 percent of the nameplate KW rating of the EPS, less applicable derating site conditions. Unity power factor is acceptable for on-site testing, provided that rated load tests at rated power factor have been performed by the manufacturer of the EPSS prior to shipment and results are available for review on site.
  2. The full load test shall be initiated immediately after the cooling time allowed above by any method that will start the prime mover and, immediately upon reaching rated rpm, pick up 100 percent of nameplate KW rating on one step, less applicable derating factors for site conditions. Record instantaneous and sustained voltage dips for all load applications and compare to manufacturer's criteria.
  3. Reconnect normal power. Record final breaker and relay positions.
  4. Disconnect load bank and reconnect medical facility loads.
  5. Allow generators to run through their cool down cycle and shutoff. Record cool down cycle time.
- C. Cycle Crank Test - Utilize any method recommended by the manufacturer to prevent the prime mover from running. Put the control switch into "run" to cause the prime mover to crank. Observe the complete crank/rest cycle as follows:
1. A complete cranking cycle shall consist of an automatic crank period of approximately 15 seconds duration followed by a rest period of approximately 15 seconds duration.
  2. Upon starting and running of the prime mover, further cranking shall cease.
  3. Two means of cranking termination shall be utilized so that one will act as backup to the other to prevent inadvertent starter engagement.
  4. All diesel prime movers shall be permitted to use continuous cranking methods.
  5. Cranking limiter time shall be 75 seconds for cycle crank and 45 seconds for continuous crank.
- D. Test all safeties specified in NFPA 110, Section 3-5.5 and 3-5.6 as recommended by the manufacturer and as required to verify proper operation.

### 3.4 INSTRUCTION

- A. Instruct Owner's representative(s) in the operation, service, and maintenance of the system in the presence of the manufacturer's representative to the satisfaction of the Owner. Obtain a written statement signed by the Owner indicating satisfaction and submit to the Architect.

### 3.5 MAINTENANCE MANUALS

- A. Provide two sets of manufacturer's standard operation and maintenance manuals, wiring diagrams, and illustrated parts books covering the set and all auxiliary components.

## SECTION 263212

## SECTION - AUTOMATIC TRANSFER SWITCHES

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. Provide automatic type switches as shown on the drawings and as required by this section.

#### 1.2 SUBMITTALS

- A. Submit manufacturer's product specification sheets on each type of switch.
- B. If modifications or deviations to these contract documents are required, submit copy of the documents affected showing all proposed changes.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. All switches shall be the product of one manufacturer.
- B. Switches shall be rated for continuous duty under full load conditions in a minimum ambient temperature range of 0 to 105 degrees F. Units which incorporate mechanically assisted ventilation systems are not acceptable.
- C. Switch contacts, coil springs, and control elements shall be easily inspectable and conveniently removable from the front of the switch without major disassembly or disconnection of power conductors.
- D. All terminals for field connection of wiring shall be factory numbered, color coded, or otherwise identified for ease of installation and maintenance.
- E. Provide additional products not specifically mentioned herein as required for proper operation and where recommended by the product manufacturer.

#### 2.2 SWITCH CONSTRUCTION

- A. Provide fully automatic double throw electrically operated mechanically held type switches conforming to UL 1008 and NEMA ICS2-447.

- B. Switches shall be capable of complete transfer in either direction in no more than one-sixth of a second.
- C. Switches shall be capable of operation in either direction with 70 percent of rated voltage available at the source.
- D. Switch operators shall be the single solenoid type connected to the transfer mechanism by a simple overcenter type linkage and energized from the source to which the load is to be transferred.
- F. Provide non-electric operator with mechanical visual position indicator arranged to permit safe manual operation of switch.
- G. Provide surface mount NEMA-1 enclosures conforming to NEMA ICS6 and UL 508, with hinged key lockable door, all switches keyed alike.

### 2.3 CONTROL SYSTEM

- A. Provide pre-engineered solid state type system to control transfer functions, auxiliary contacts and indicators.
- B. Control system shall meet the voltage surge withstand capability in accordance with ANSI C37.90-1978 and the impulse withstand voltage test in accordance with proposed NEMA ICS1-109.
- C. Control system components shall be installed on plug-in type printed circuit cards removable from the front of the switch, keyed to prevent improper insertion, and equipped with protective cover(s).
- D. All control relays shall be the industrial control grade plug-in type with dust covers.
- E. Provide field adjustable factory set close differential voltage sensors to monitor all ungrounded lines of the normal power source.
- F. Provide field adjustable factory set voltage and frequency sensors to monitor two of the three ungrounded lines of the emergency power source.
- G. Provide field adjustable factory set timer to delay engine start signal upon loss of normal power source.
- H. Provide field adjustable factory set timer to delay transfer to emergency power source.
- I. Provide field adjustable factory set timer to delay transfer to normal power source with automatic bypass upon loss of emergency power source.
- J. Provide field adjustable factory set timer to delay shutdown of emergency generator after successful re-transfer to normal power source.



- K. Provide manually operated momentary contact test switch that will simulate normal power source failure and cause transfer switch to operate.
- L. Provide two visual indicators to annunciate transfer switch position.
- M. Provide auxiliary dry contact set to start emergency generator engine. Obtain required characteristics from emergency generator supplier.
- N. Provide two auxiliary dry SPST contact sets rated 10A at 208V AC, closed with transfer switch in the normal position for future use.
- O. Provide two auxiliary dry SPST contact sets rated 10A at 208V AC, closed with transfer switch in the emergency position for future use.
- P. Provide automatic 7-day clock exerciser with 15 to 20 minute adjustment range, selector switch to cause and prevent transfer switch operation, and override circuit to provide immediate retransfer to normal if emergency fails.

#### 2.4 ACCESSORIES

- A. Provide factory made unswitched connector block having an amperage rating equal to the switches maximum rating for neutral cable connections.
- B. Provide auxiliary dry contact sets with ratings and operational characteristics as required by elevator manufacturer.

#### 2.5 LOW VOLTAGE CIRCUITS

- A. Provide low voltage signal and control circuits from switches to elevator controllers [as indicated on the drawings and] in accordance with elevator manufacturers requirements.
- B. Provide raceways, wire, and cable of the types and sizes recommended by the elevator manufacturer. Where no such recommendation exists, comply with applicable portions of other Division 26 specification sections.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install all low voltage control and signal conductors in conduit, or other type of raceway where indicated, unless specifically indicated otherwise.
- B. Install switches as indicated and in accordance with manufacturers written instructions, approved shop drawings, applicable code requirements, NECA "Standard of Installation," and

recognized industry practice to ensure that switches comply with requirements and serves the intended purpose.

### 3.2 IDENTIFICATION DEVICES

- A. Install label at each switch. Label shall be red and 1/2" tall with 1/4" tall white text indicating the switch 'mark' and system branch.
- B. Example: 'ATS-C' - critical branch.

### 3.3 MAINTENANCE MANUALS

- A. Provide manufacturer's standard operators manual for each type of switch provided.

## SECTION 263622

## SECTION 313116 - TERMITE CONTROL

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Soil treatment with termiticide.

#### 1.2 SUBMITTALS

##### A. Product Data: For each type of product indicated. Include the EPA-Registered Label for termiticide products.

##### B. Product certificates.

##### C. Soil Treatment Application Report: Include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

##### D. Warranties: Sample of special warranties.

#### 1.3 QUALITY ASSURANCE

##### A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.

##### B. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

#### 1.4 PROJECT CONDITIONS

##### A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

- B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

#### 1.5 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
  - 1. Warranty Period: 5 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 SOIL TREATMENT

- A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Corporation, Agricultural Products; Termidor.
    - b. Bayer Environmental Science; Premise 75.
    - c. FMC Corporation, Agricultural Products Group; Prevail.
    - d. Syngenta; Demon TC.
  - 2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five (5) years against infestation of subterranean termites.

### PART 3 - EXECUTION

#### 3.1 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

#### 3.2 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of

termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
  2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
  3. Masonry: Treat voids.
  4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.