

**PROJECT  
MANUAL**

**RI Dept. of Transportation  
Volume 1 - RI Welcome Center  
Richmond, Rhode Island**

Prepared by  
**Federal Hill Group Architects**

I-95 (Northbound)  
Richmond Rhode Island 02832  
**Project Number RICAP 131**

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PART 1 - GENERAL

1.1 PROJECT MANUAL

A. VOLUME 1.

1. Rhode Island Welcome Center Pump House Improvements & Public Water System Upgrades.
2. Rhode Island Department of Transportation.
3. I-95 North (Richmond), RI.
4. Architect Project No. 23-112.
5. Federal Hill Group Architects.
6. 137 Dean Street - 2nd Floor.
7. Providence, RI 02903
8. Phone: 401.404.4930
9. Website: [www.fedhillgroup.com](http://www.fedhillgroup.com)
10. Issued: November 15, 2024.
11. Copyright 2024 Federal Hill Group Architects.
12. RI Contract: 2025-CF-002
13. RICAP: 131
14. VOLUME 1

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 000101

DOCUMENT 002213 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.1 INSTRUCTIONS TO BIDDERS

- A. Instructions to Bidders for Project consist of the following:
1. AIA Document A701-2018, "Instructions to Bidders," a copy of which is bound in this Project Manual.
  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 A701-2018, "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 will remain in effect.

1.3 ARTICLE 2 - BIDDER'S REPRESENTATIONS

- A. Add the following to 2.1:
1. .7 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.
  2. The Bidder shall include all permit fees, including any and all design and fire review fees that have accrued as part of the design review process.
  3. .8 The Bidder is a properly licensed Contractor according to the laws and regulations of the State of Rhode Island and meets qualifications indicated in the Bidding Documents.
  4. .9 The Bidder has incorporated into the Bid adequate sums for work performed by Installers whose qualifications meet those indicated in the Bidding Documents.

1.4 ARTICLE 3 - BIDDING DOCUMENTS

- A. 3.1 - Distribution:
1. Add the following to 3.1.1:
    - a. Obtain electronic Bidding Documents as instructed in the Advertisement for Bids.
- B. 3.2 - Modification or Interpretation of Bidding Documents:
1. Add the following to 3.2.2:

- a. Submit Bidder's Requests for Interpretation using form furnished on web-based bidding management software indicated in the Advertisement for Bids.

C. 3.4 - Addenda:

1. Add the following to 3.4.1:
  - a. Addenda will be transmitted by the issuing office using web-based bidding management software indicated in the Advertisement for Bids.
2. Delete 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.

1.5 ARTICLE 4 - BIDDING PROCEDURES

A. 4.1 - Preparation of Bids:

1. Add the following to 4.1.1:
  - a. Printable electronic Bid Forms and related documents are available from web-based bidding management software site indicated in the Advertisement for Bids.
2. Add the following to 4.1.8:
3. Add the following to 4.1:
  - a. 4.1.9 Owner may elect to disqualify a bid due to failure to submit a bid in the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.

B. 4.2 - Bid Security:

1. Add the following to 4.2.1:
  - a. Provide bid security in the amount of 5 percent of the bid amount in the form of a cashier's check or surety bond meeting the requirements of 4.2.3.

C. 4.3 - Submission of Bids:

1. Add the following to 4.3.1:
  - a. Submit electronic bids using web-based bidding management software indicated in the Advertisement for Bids.

D. 4.4 - Modification or Withdrawal of Bids:

1. Add the following to 4.4.1:
  - a. .1 Such modifications to or withdrawal of a bid may only be made by persons

authorized to act on behalf of the Bidder. Authorized persons are those so identified in the Bidder's corporate bylaws, specifically empowered by the Bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the Bid.

E. 4.5 - Break-Out Pricing Bid Supplement:

1. Add 4.5.
2. Add the following to 4.5:
  - a. 4.5.1 Provide detailed cost breakdowns[ **on forms provided**] no later than two business days following Architect's request.

F. 4.6 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:

1. Add 4.6.

1.6 ARTICLE 6 - POSTBID INFORMATION

A. 6.3 - Submittals:

1. Add the following to 6.3.1:
  - a. .4 Submit information requested in 6.3.1. no later than two business days following Architect's request.

1.7 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

A. 7.1 - Bond Requirements:

1. Add the following to 7.1.1:
  - a. .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. Replace the first sentence of 7.2.1 with the following:
  - a. The Bidder shall deliver the required bonds to Owner no later than 10 days after the date of a 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.

1.8 ARTICLE 8 - ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

A. 8.1 - Proposed Contract Documents:

1. Replace .5 in 8.1 with the following:
  - a. .5 Enumeration of Drawings: The Drawings constituting a portion of the proposed Contract Documents are identified on the Cover Sheet or Title Sheet of the Drawings titled Proposed Renovations to the RI Welcome Center dated 8/27/24.
2. Replace .6 in 8.1 with the following:
  - a. .6 Enumeration of Specifications: The Specifications constituting a portion of the proposed Contract Documents are identified on the Table of Contents Sheet of the Project Manual titled Proposed Renovations to the RI Welcome Center dated 8/27/24.
3. Replace .7 in 8.1 with the following:
  - a. .7 Addenda: Portions of the Addenda constituting a portion of the proposed Contract Documents will be enumerated in the Owner/Contractor Agreement.
4. Replace .8 in 8.1 with the following:
  - a. .8 Other Exhibits: Other Exhibits constituting portions of the proposed Contract Documents will be identified in the Bidding Documents and be enumerated in the Owner/Contractor Agreement.

1.9 ARTICLE 9 - EXECUTION OF THE CONTRACT

A. Add Article 9.

B. Add the following to Article 9:

1. 9.1 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 through Architect, in such number of counterparts as Owner may require.
2. 9.2 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. 9.3 Unless otherwise indicated in the Bidding Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement.
4. 9.4 In the event of a default, Owner may declare the amount of the Bid security forfeited and elect to either award the Contract to the next responsible bidder or re-advertise for bids.



Federal Hill Group Architects  
Providence, Rhode Island

RI Dept. of Transportation  
Volume 1 - Welcome Center  
I95, Richmond, RI

PART 2 - PRODUCTS (Not Used)  
PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 002213

## DOCUMENT 002600 - PROCUREMENT SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids in accordance with Instructions to Bidders.
- B. Procurement Prior Approval Requests: Requests for approval of products or manufacturers from those required by the Contract Documents as defined by product selection procedures in Section 016000 "Product Requirements."
  - 1. Procurement prior approval is required when products or manufacturers are listed in specifications under "Sole Product," "Sole Manufacturer," "Limited List of Products," or "Limited List of Manufacturers" introductory paragraphs.
  - 2. Procurement prior approval is not required when products or manufacturers are listed in specifications under "Non-Limited List of Products" or "Non-Limited List of Manufacturers" introductory paragraphs.
  - 3. Where use of "Sole Product," "Sole Manufacturer," "Limited List of Products," or "Limited List of Manufacturers" introductory paragraphs is not allowed by statute, procurement prior approval request is not required.
- C. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See the General Conditions and Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

#### 1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

#### 1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with general intent of the Contract Documents, including level of quality of the Work represented by requirements therein.
3. Request is fully documented and properly submitted.

#### 1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:

1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
2. Submittal Format, Electronic: Submit Procurement Substitution Request, using format provided on Project web-based bidding management software site.
  - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and Drawing numbers.
  - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
    - 1) List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
    - 2) Product data, including drawings and descriptions of products and fabrication and installation procedures.
    - 3) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
    - 4) Copies of current, independent third-party test data of salient product or system characteristics.
    - 5) Samples where applicable or when requested by Architect.
    - 6) Detailed comparison of significant qualities of proposed substitute with those of the Work specified. 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.
    - 7) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - 8) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
    - 9) 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, which will become necessary to accommodate proposed substitute.
  - c. Provide certification by manufacturer that proposed substitute is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to product or equipment specified in the application indicated.
  - d. Bidder, in submitting the Procurement Substitution Request, waives the right to

additional payment or an extension of Contract Time because of the failure of substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all Bidders of acceptance of proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

- C. Architect's approval of substitute during bidding does not relieve Contractor of the responsibility to submit required Shop Drawings and to comply with all other requirements of the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 002600

DOCUMENT 002601 - REQUEST FOR SUBSTITUTION FORM, BIDDING PHASE

PART 1 - GENERAL

1.1 SUMMARY

- A. Prime Bidders: Use this form to request consideration of an unnamed manufacturer, an unnamed product, or an alternative fabrication method prior to submittal of bids when use of specific manufacturers, products, or fabrications methods are required by the Specifications.
- B. See Document 002600 "Procurement Substitution Procedures" for instructions for submittal of this form and for definitions used on this form.
- C. This form is not required to be submitted when named products are introduced by the phrase "Available products include..." unless the intended product differs substantially from the requirements of the Contract Documents.
- D. Response to this request by Architect will be in the form of a written response to the Bidder and, if approved, by Addendum issued to all Bidders.

1.2 PROJECT INFORMATION

- A. Project Name: Renovations to the RI Welcome Center.
- B. Project Location: I-95 N (Richmond), RI.
- C. Owner: Insert name of Owner | Department of Transportation.
- D. Owner Project Number: <Insert Owner Project number>.
- E. Architect: Federal Hill Group Architects.
- F. Architect Project Number: <Insert Architect Project number>.

1.3 BIDDING REQUEST INFORMATION

- A. Bidder: \_\_\_\_\_ . Email: \_\_\_\_\_ .
- B. Specification Section No.: \_\_\_\_\_ .

1.4 SPECIFIED PRODUCT

- A. Specified Product/Fabrication Method (List Name, Description, Model Number, and Manufacturer): \_\_\_\_\_ .

B. Specified Product Information (Attach Point-by-Point Data to This Form):

1.  Point-by-point comparative product data.
2.  Test reports.
3.  Fabrication drawings.
4.  Samples (where applicable).

1.5 PROPOSED PRODUCT

A. Specified Product/Fabrication Method (List Name, Description, Model Number, and Manufacturer): \_\_\_\_\_.

B. Proposed Product Information (Attach Point-by-Point Data to This Form):

1.  Point-by-point comparative product data.
2.  Test reports.
3.  Fabrication drawings.
4.  Samples (where applicable).

1.6 IMPACT OF PROPOSED SUBSTITUTION

A. List of Related Changes Required by Substitution:  None. Explain:  
\_\_\_\_\_.

B. Differences between Specified Product and Proposed Substitution:  None. Explain:  
\_\_\_\_\_.

C. Proposed Product/Fabrication Method Effects on Other Parts of the Work:  None. Explain:  
\_\_\_\_\_.

D. Proposed Product/Fabrication Method Effects on the Contract Time:  None. Explain:  
\_\_\_\_\_.

1.7 CERTIFICATION

A. Undersigned certifies the following:

1. Proposed substitution has been investigated by the Bidder and determined to be equal or superior to specified product as used for this Project, except as noted herein.
2. Qualifications of manufacturer, Installer, and other specified parties meet the specified qualifications.
3. Same warranty will be furnished for proposed substitution as for specified product, if applicable.
4. Same maintenance service and availability of replacement parts as for specified product, if applicable.
5. Proposed substitution does not affect dimensions and functional clearances, except as noted herein.
6. Proposed substitution will not affect the Contract Time.

7. Proposed substitution will not affect work of other trades.
8. Proposed substitution provides comparable sustainable design properties as specified product, if applicable.

1.8 SUBMISSION OF REQUEST FOR SUBSTITUTION

A. For the Bidder:

1. Submittal Date: \_\_\_\_\_.
2. Firm Name: \_\_\_\_\_.
3. Submitted by: \_\_\_\_\_.
4. Email: \_\_\_\_\_.

B. For Manufacturer:

1. Submittal Date: \_\_\_\_\_.
2. Firm Name: \_\_\_\_\_.
3. Submitted by: \_\_\_\_\_.
4. Email: \_\_\_\_\_.

PART 2 - PRODUCTS (Not Used)  
PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 002601

DOCUMENT 003143 - PERMIT APPLICATION

PART 1 - GENERAL

1.1 PERMIT APPLICATION INFORMATION

- A. This Document, with its referenced attachments, is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. This Document and its attachments are not part of the Contract Documents.
- B. Permit Application: The building permit for Project has been applied for by Architect. .
  - 1. All permit and plan review fees shall be the responsibility of the General Contractor.
  - 2. Review fees include, but are not limited to , the RI Building Code Official's review, the State Fire Marshal's Review, and any / all other associated fees and costs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 003143



## DOCUMENT 006000 - PROJECT FORMS

### PART 1 - GENERAL

#### 1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions to be used for Project:
  - 1. AIA Document A101-2017 "Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum."
    - a. The General Conditions for Project are AIA Document A201-2017 "General Conditions of the Contract for Construction." - Rhode Island Specific edition
  - 2. The General Conditions are incorporated by reference.
  - 3. The Supplementary Conditions for Project are separately prepared and included in the Project Manual.
  - 4. Owner's document(s) bound following this Document.

#### 1.2 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from AIA Contract Documents:  
<https://aicontracts.com>.
- C. Preconstruction Forms:
  - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312-2010 "Performance Bond" and AIA Document A312-2010 "Payment Bond."
  - 2. Form of Certificate of Insurance: AIA Document G715-2017 "Supplemental Attachment for ACORD Certificate of Insurance 25."
- D. Information and Modification Forms:
  - 1. Form for Requests for Information (RFIs): AIA Document G716-2004 "Request for Information (RFI)."
  - 2. Form of Request for Proposal: AIA Document G709-2018 "Proposal Request."
  - 3. Change Order Form: AIA Document G701-2017 "Change Order."
  - 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G710-2017 "Architect's Supplemental Instructions."
  - 5. Form of Change Directive: AIA Document G714-2017 "Construction Change Directive."
- E. Payment Forms:

1. Schedule of Values Form: AIA Document G703-1992 "Continuation Sheet."
2. Payment Application, Lump Sum Project: AIA Document G702-1992 "Application and Certificate for Payment" and G703-1992 "Continuation Sheet."
3. Payment Application, Cost of the Work Project with GMP: AIA Document G702GMP-2021 "Application and Certificate for Payment for Cost of the Work Projects with a Guaranteed Maximum Price" and G703CW-2021 "Continuation Sheet for Cost of the Work Projects."
4. Payment Application, Cost of the Work Project without GMP: AIA Document G702CW-2021 "Application and Certificate for Payment for Cost of the Work Projects without a Guaranteed Maximum Price" and G703CW-2021 "Continuation Sheet for Cost of the Work Projects."
5. Payment Application, CM as Adviser Projects: AIA Document G732-2019 "Application and Certificate for Payment, Construction Manager as Advisor Edition" and G703-1992 "Continuation Sheet."
6. Form of Contractor's Affidavit: [**AIA Document G706-1994 "Contractor's Affidavit of Payment of Debts and Claims"**]**<Insert name of applicable document>**.
7. Form of Affidavit of Release of Liens on Progress Payments: AIA Document G901-2022 "Conditional Waiver and Release on Progress Payment" and AIA Document G902-2022 "Unconditional Waiver and Release on Progress Payment".
8. Form of Affidavit of Release of Liens on Final Payments: AIA Document G903-2022 "Conditional Waiver and Release on Final Payment" AIA Document G904-2022 "Unconditional Waiver and Release on Final Payment".
9. Form of Consent of Surety: AIA Document G707-1994 "Consent of Surety to Final Payment."

PART 2 - PRODUCTS (Not Used)  
PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 006000

## SECTION 011000 - SUMMARY

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work performed by Owner.
5. Multiple Work Packages.
6. Work under Owner's separate contracts.
7. Owner's product purchase contracts.
8. Owner-furnished/Contractor-installed (OFICI) products.
9. Owner-furnished/Owner-installed (OFOI) products.
10. Contractor-furnished/Owner-installed (CFOI) products.
11. Contractor's use of site and premises.
12. Coordination with occupants.
13. Work restrictions.
14. Specification and Drawing conventions.
15. Miscellaneous provisions.

##### B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.2 DEFINITIONS

- ##### A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

#### 1.3 PROJECT INFORMATION

- ##### A. Project Identification: Proposed Renovations to the RI Welcome Center (Volume 1).

1. Project Location: I-95 North (Richmond), RI.

- ##### B. Owner: Rhode Island Department of Transportation.

1. Owner's Representative: Spiros Fotopoulos - Project Manager.

- ##### C. Architect: Federal Hill Group Architects.

1. Architect's Representative: Christopher Velleca.
- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:
  1. MEP/FP: G.W. Preiss & Sons.
    - a. All disciplines Representative: Gordon Preiss, PE.
- E. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
  1. See Section 013100 "Project Management and Coordination" for requirements for using web-based Project software.

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
  1. The scope of work is broken into two volumes. Volume 1 relates to the work associated with the Welcome Center interior removations. Volume 2 relates to the work associated with the well water, supply, pump house and related tasks. and other Work indicated in the Contract Documents.
- B. Type of Contract:
  1. Project will be constructed under a single prime contract.

#### 1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage

caused by construction operations.

## 1.6 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

## 1.7 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
1. Weekend Hours: Coordinate weekend hours with the RIDoT.
  2. Early Morning Hours: Coordinate off-hours work with the RIDoT.
  3. Hours for Utility Shutdowns: Coordinate all outages with RIDoT no less than 5 business days before scheduled shut down..
- 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 arranging for temporary utility services according to requirements indicated:
1. Notify Owner not less than five business days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than five business days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances on Project site is not permitted.

## 1.8 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. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
  3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
  4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on 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 012500 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
  - 2. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

#### 1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
  - 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 to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying 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 method cannot be provided, if applicable.
    - b. Coordination of information, including a list of changes or revisions 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 substitutions 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

## SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

#### 1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue[ **through Construction Manager**] supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

#### 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. Work Change 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 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 forms 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.
  - 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.
  - 6. Comply with requirements in Section 012500 "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 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

#### 1.5 CHANGE ORDER PROCEDURES

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

#### 1.6 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, for subsequent inclusion in a Change Order.
  - 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.
- 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

- features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within [seven]<Insert number> days of receipt of a request for substitution. Architect will notify Contractor [ **through Construction Manager**] of acceptance or rejection of proposed substitution within [15]<Insert number> days of receipt of request, or [seven]<Insert number> days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### 1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

#### 1.5 PROCEDURES

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

## 1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than [15]<Insert number> 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. Requested substitution provides sustainable design characteristics that specified product provided for compliance with ASHRAE 189.1 requirements.
    - c. Substitution request is fully documented and properly submitted.
    - d. Requested substitution will not adversely affect Contractor's construction schedule.
    - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - f. Requested substitution is compatible with other portions of the Work.
    - g. Requested substitution has been coordinated with other portions of the Work.
    - h. Requested substitution provides specified warranty.
    - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience:
1. Not allowed unless otherwise indicated.
  2. Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
    - a. 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:
      - 1) 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.
      - 2) Requested substitution does not require extensive revisions to the Contract Documents.
      - 3) Requested substitution is consistent with the Contract Documents and will produce indicated results.
      - 4) Substitution request is fully documented and properly submitted.
      - 5) Requested substitution will not adversely affect Contractor's construction schedule.

- 6) Requested substitution has received necessary approvals of authorities having jurisdiction.
- 7) Requested substitution is compatible with other portions of the Work.
- 8) Requested substitution has been coordinated with other portions of the Work.
- 9) Requested substitution provides specified warranty.
- 10) If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

## SECTION 012900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### 1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than ten days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- B. Format and Content: Use 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. Owner's name.
    - c. Owner's Project number.
    - d. Name of Architect.
    - e. Architect's Project number.
    - f. Contractor's name and address.
    - g. 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. Name of subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
    - 1) Labor.
    - 2) Materials.
    - 3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of [**five**]<Insert number> percent of the Contract Sum.
  5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site.
  6. 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.
  7. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
  8. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
  9. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
  10. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

### 1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Architect by the 20th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
1. Other Application for Payment forms proposed by the Contractor may be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. Transmittal: Submit electronic 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.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:



1. Schedule of values.
  2. Contractor's construction schedule (preliminary if not final).
  3. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
  4. Products list (preliminary if not final).
  5. Sustainable design action plans, including preliminary project materials cost data.
  6. Schedule of unit prices.
  7. Submittal schedule (preliminary if not final).
  8. List of Contractor's staff assignments.
  9. List of Contractor's principal consultants.
  10. Copies of building permits.
  11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  12. Initial progress report.
  13. Performance and payment bonds.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
    - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, 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. Certification of completion of final punch list items.
  3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  4. Updated final statement, accounting for final changes to the Contract Sum.
  5. AIA Document G706.
  6. AIA Document G706A.
  7. AIA Document G707.
  8. Evidence that 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.
  11. Proof that taxes, fees, and similar obligations are paid.
  12. Waivers and releases.

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Volume 1 - Welcome Center  
I95, Richmond, RI

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 coordination procedures.
  - 2. Coordination drawings.
  - 3. RFIs.
  - 4. Web-based Project management software package.
  - 5. Project meetings.
- B. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.2 DEFINITIONS

- A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in built facility. Keep list current at all times.

#### 1.4 GENERAL COORDINATION PROCEDURES

- 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 if coordination of their Work is required.

## 1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - e. Indicate required installation sequences.
    - f. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Mechanical Rooms: Provide coordination drawings for mechanical rooms, showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical

- equipment.
3. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  4. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - c. Fire-rated enclosures around ductwork.
  5. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit **1** in diameter and larger.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor-control center locations.
    - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
  6. Fire-Protection System: Show the following:
    - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
  7. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

#### 1.6 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
  2. Coordinate and submit RFIs in a prompt manner 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. Owner name.
  3. Owner's Project number.
  4. Name of Architect.
  5. Architect's Project number.
  6. Date.

7. Name of Contractor.
  8. RFI number, numbered sequentially.
  9. RFI subject.
  10. Specification Section number and title and related paragraphs, as appropriate.
  11. Drawing number and detail references, as appropriate.
  12. Field dimensions and conditions, as appropriate.
  13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  14. Contractor's signature.
  15. 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: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow ten 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 Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. 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 by Architect of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log . Use software log that is part of web-based Project management software.
1. Project name.

2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number, including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
  8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- F. 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 three days if Contractor disagrees with response.

#### 1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
  2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
  3. Digital Drawing Software Program: Contract Drawings are available in .rvt and/or .dwg format.
  4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
    - a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.
  5. The following digital data files will be furnished for each appropriate discipline:
    - a. Floor plans.
    - b. Reflected ceiling plans.
    - c. Other requested drawings / files as applicable.
- B. Web-Based Project Management Software Package: Provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
1. Web-based Project management software includes, at a minimum, the following features:
    - a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
    - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
    - c. Document workflow planning, allowing customization of workflow between project entities.

- d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
  - e. Track status of each Project communication in real time, and log time and date when responses are provided.
  - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
  - g. Processing and tracking of payment applications.
  - h. Processing and tracking of contract modifications.
  - i. Creating and distributing meeting minutes.
  - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
  - k. Management of construction progress photographs.
  - l. Mobile device compatibility, including smartphones and tablets.
  - m. <Insert description of software feature>.
2. Provide up to seven Project management software user licenses for use of Owner, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
  3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
  4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Autodesk, Inc.
    - b. Corecon Technologies, Inc.
    - c. Deltek Inc.
    - d. Meridian Systems, Inc.
    - e. Newforma, Inc.
    - f. Procore Technologies, Inc.
    - g. Viewpoint, Inc.; a Trimble Company.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
  3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  1. Attendees: Inform participants and others involved, and individuals whose presence is



- required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of seven days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. 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.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Critical work sequencing and long lead items.
    - d. Designation of key personnel and their duties.
    - e. Use of web-based Project software.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for processing Applications for Payment.
    - i. Submittal procedures.
    - j. Preparation of Record Documents.
    - k. Use of the premises and existing building.
    - l. Work restrictions.
    - m. Working hours.
    - n. Owner's occupancy requirements.
    - o. Responsibility for temporary facilities and controls.
    - p. Procedures for disruptions and shutdowns.
    - q. Construction waste management and recycling.
    - r. Parking availability.
    - s. Office, work, and storage areas.
  3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 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.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Procedures for completing and archiving web-based Project software site data files.
    - d. Submittal of written warranties.
    - e. Requirements for completing sustainable design documentation.
    - f. Requirements for preparing operations and maintenance data.
    - g. Requirements for delivery of material samples, attic stock, and spare parts.
    - h. Requirements for demonstration and training.
    - i. Preparation of Contractor's punch list.
    - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - k. Submittal procedures.
    - l. Owner's partial occupancy requirements.
    - m. Installation of Owner's furniture, fixtures, and equipment.
    - n. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- D. Progress Meetings: Conduct progress meetings at biweekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. 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 use.
  - 8) Temporary facilities and controls.
  - 9) Progress cleaning.
  - 10) Quality and work standards.
  - 11) Status of correction of deficient items.
  - 12) Field observations.
  - 13) Status of RFIs.
  - 14) Status of Proposal Requests.
  - 15) Pending changes.
  - 16) Status of Change Orders.
  - 17) Pending claims and disputes.
  - 18) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

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. Startup construction schedule.
  2. Contractor's Construction Schedule.
  3. Construction schedule updating reports.
  4. Daily construction reports.
  5. Material location reports.
  6. Site condition reports.
  7. Unusual event reports.
- B. Related Requirements:
1. Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.
  2. Section 014000 "Quality Requirements" for schedule of tests and inspections.

#### 1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  2. Predecessor Activity: An activity that precedes another activity in the network.
  3. Successor Activity: An activity that follows another activity in the network.
- B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- C. Event: The starting or ending point of an activity.
- D. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  3. Total float is the measure of leeway in starting or completing an activity without

adversely affecting the planned Project completion date.

- E. Resource Loading: The allocation of labor and equipment necessary for completing an activity as scheduled.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file.
  - 2. PDF file.
- B. Startup construction schedule.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at weekly intervals.
- F. Material Location Reports: Submit at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Event Reports: Submit at time of unusual event.

### 1.4 COORDINATION

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

### 1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that is capable of managing construction schedules.
  - 1. Use Microsoft Project for current Windows operating system.

- B. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.
1. Contract completion date to not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
    - a. Securing of approvals and permits required for performance of the Work.
    - b. Temporary facilities.
    - c. Construction of mock-ups, prototypes and samples.
    - d. Owner interfaces and furnishing of items.
    - e. Interfaces with Separate Contracts.
    - f. Regulatory agency approvals.
    - g. Punch list.
  3. Procurement Activities: Include procurement process activities for the following long lead-time 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.
  4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's[ **and Construction Manager's**] administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Work under More Than One Contract: Include a separate activity for each contract.
  2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  3. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use-of-premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.

- h. Environmental control.
  - 4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.
    - l. Startup and placement into final use and operation.
  - 5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. Structural completion.
    - b. Temporary enclosure and space conditioning.
    - c. Permanent space enclosure.
    - d. Completion of mechanical installation.
    - e. Completion of electrical installation.
    - f. Substantial Completion.
  - 6. Other Constraints: Each volume of work shall have a separate and stand-alone schedule.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion[.], **and the following interim milestones:**]
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
- 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and the Contract Time.
- G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule before each regularly scheduled progress meeting.
- 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate Final Completion percentage for each activity.
- H. Recovery Schedule: When periodic update indicates the Work is [14]<Insert number> or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- I. Distribution: Distribute copies of approved schedule to Architect[, **Construction Manager,**] 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.

#### 1.6 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.
1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

#### 1.7 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. Equipment at Project site.
  5. Material deliveries.
  6. High and low temperatures and general weather conditions, including presence of rain or snow.
  7. Testing and inspection.
  8. Accidents.
  9. Meetings and significant decisions.
  10. Unusual events.



11. Stoppages, delays, shortages, and losses.
  12. Meter readings and similar recordings.
  13. Emergency procedures.
  14. Orders and requests of authorities having jurisdiction.
  15. Change Orders received and implemented.
  16. Construction Change Directives received and implemented.
  17. Services connected and disconnected.
  18. Equipment or system tests and startups.
  19. Partial completions and occupancies.
  20. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site 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.
- C. Unusual Event Reports: 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, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)  
PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
5. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

#### 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 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 Specification Sections as "informational submittals."

#### 1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list 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 revisions to submittals noted by 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. Final Submittal Schedule: Submit concurrently with the first complete submittal of

Contractor's construction schedule.

- a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
3. Format: Arrange the following information in a tabular format:
  - a. Scheduled date for first submittal.
  - b. Specification Section number and title.
  - c. Submittal Category: Action; informational.
  - d. Name of subcontractor.
  - e. Description of the Work covered.
  - f. Scheduled date for Architect's final release or approval.

#### 1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

E. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

## 1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## 1.6 SUBMITTAL REQUIREMENTS

- A. 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 unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

- a. Manufacturer's catalog cuts.
- b. Manufacturer's product specifications.
- c. Standard color charts.
- d. Statement of compliance with specified referenced standards.
- e. Testing by recognized testing agency.
- f. Application of testing agency labels and seals.
- g. Notation of coordination requirements.
- h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

- a. Wiring diagrams that show 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 Shop Drawings, and before or concurrently with Samples.

- B. 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 on 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 dimensions established by field measurement.
- f. Relationship and attachment to adjoining construction clearly indicated.
- g. Seal and signature of professional engineer if specified.

- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
  - a. Project name and submittal number.
  - b. Generic description of Sample.
  - c. Product name and name of manufacturer.
  - d. Sample source.
  - e. Number and title of applicable Specification Section.
  - f. Specification paragraph number and generic name of each item.
3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
  - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
  - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
5. 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 one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one 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 sets of

paired units that show approximate limits of variations.

- D. 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.
- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- F. Certificates:
  - 1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
  - 2. 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.
  - 3. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
  - 4. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
  - 5. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

#### 1.7 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project management software. Include 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.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

#### 1.8 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
  - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate

- action.
2. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
  - C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
  - D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
  - E. Architect will return without review submittals received from sources other than Contractor.
  - F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)  
PART 3 - EXECUTION (Not Used)

END OF SECTION 013300



## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

#### 1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms, including "requested," "authorized," "selected," "required," and "permitted," have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms, including "shown," "noted," "scheduled," and "specified," have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### 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.
  - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

### 1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
  - 1. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
  - 2. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 3. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
  - 1. CPSC - U.S. Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
  - 2. DOC - U.S. Department of Commerce; [www.commerce.gov](http://www.commerce.gov).
  - 3. DOD - U.S. Department of Defense; [www.defense.gov](http://www.defense.gov).
  - 4. DOE - U.S. Department of Energy; [www.energy.gov](http://www.energy.gov).
  - 5. DOJ - U.S. Department of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov)
  - 6. DOS - U.S. Department of State; [www.state.gov](http://www.state.gov).
  - 7. EPA - United States Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
  - 8. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
  - 9. GPO - U.S. Government Publishing Office; [www.gpo.gov](http://www.gpo.gov).
  - 10. GSA - U.S. General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  - 11. HUD - U.S. Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
  - 12. LBNL - Lawrence Berkeley National Laboratory; Energy Technologies Area; [www.lbl.gov/](http://www.lbl.gov/).
  - 13. NIST - National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
  - 14. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
  - 15. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; [www.trb.org](http://www.trb.org).
  - 16. USACE - U.S. Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
  - 17. USDA - U.S. Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
  - 18. USDA - U.S. Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
  - 19. USP - U.S. Pharmacopeial Convention; [www.usp.org](http://www.usp.org).

20. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from U.S. Government Publishing Office; [www.govinfo.gov](http://www.govinfo.gov).
2. DOD - U.S. Department of Defense; Military Specifications and Standards; Available from DLA Document Services; [www.dsp.dla.mil/Specs-Standards/](http://www.dsp.dla.mil/Specs-Standards/).
3. DSCC - Defense Supply Center Columbus; (see FS).
4. FED-STD - Federal Standard; (see FS).
5. FS - Federal Specification; Available from DLA Document Services; [www.dsp.dla.mil/Specs-Standards/](http://www.dsp.dla.mil/Specs-Standards/).
  - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
  - b. Available from U.S. General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  - c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org](http://www.wbdg.org).
6. MILSPEC - Military Specifications and Standards; (see DOD).
7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (see USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. BEARHFTI; California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; (see BHGS).
2. BHGS; State of California Bureau of Household Goods and Services; (Formerly: California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation); [www.bhgs.dca.ca.gov](http://www.bhgs.dca.ca.gov).
3. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.oal.ca.gov/publications/ccr/](http://www.oal.ca.gov/publications/ccr/).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; [www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx](http://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx).
5. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
6. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; <https://tfsweb.tamu.edu/>.

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 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

#### 1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities to be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
1. Sign shall be pre-printed in color and mounted on a 4'x8' plywood panel and anchored independent of the building in a location to be determined. Information shall be provided identifying the following:
    - a. Name of General Contractor
    - b. Name of Architect and Engineering firms
    - c. Owner Information and Governor's office information
    - d. Relevant Project Information / Description
  2. Signage shall be maintained throughout the entire duration of the project.
  3. RI DoT Project standard signage shall also be provided in addition to the above signage.
    - a. RI DoT shall provide required signage type, formatting, and content.
- D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
1. Locations of dust-control partitions at each phase of work.
  2. HVAC system isolation schematic drawing.
  3. Location of proposed air-filtration system discharge.
  4. Waste-handling procedures.
  5. Other dust-control measures.
- E. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by Owner. Include the following:
1. Methods used to meet the goals and requirements of Owner.
  2. Concrete cutting method(s) to be used.
  3. Location of construction devices on the site.
  4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
  5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with Owner.
  6. Indicate locations of sensitive equipment areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

#### 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.
- C. Accessible Temporary Egress: Comply with applicable provisions in ICC A117.1.

## 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. 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 concrete bases for supporting posts.
- B. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain-link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, **10-mil** minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum **36 by 60 inches**.

### 2.2 TEMPORARY FACILITIES

- A. Field Offices:
  - 1. General Contractor is allowed to establish a field office within the confines of the existing work area for the duration of the project.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

### 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating

units is prohibited.

2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

### PART 3 - EXECUTION

#### 3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

#### 3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

#### 3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  1. Temporary toilet facilities shall be self contained with effluent being disposed of legally by the temporary restroom provider off-site.
- C. Water Service:
  1. Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
  2. Temporary water may be required if the water service is temporarily unavailable as a result of the work being performed on the existing water supply / pumps.
    - a. Temporary water shall be the fiscal responsibility of the general contractor.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash

facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.
- E. Temporary 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. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Electric Power Service:
1. Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
  2. Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
    - a. Install electric power service overhead unless otherwise indicated.
    - b. Connect temporary service to Owner's existing power source, as directed by Owner.
- G. 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.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment .
1. Provide additional telephone lines for the following:
  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. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Engineers' offices.
    - g. Owner's office.
    - h. Principal subcontractors' field and home offices.
- I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.



### 3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
  - 1. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
  
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.
  - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
  
- C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
  - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  - 2. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  - 3. 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 in accordance with Section 321216 "Asphalt Paving."
  
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
  
- E. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
  
- F. Storage and Staging: Use designated areas of Project site for storage and staging needs.
  
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 2. Maintain and touch up signs, so they are legible at all times.
  
- H. Waste Disposal Facilities:
  - 1. Comply with requirements specified in Section 017419 "Construction Waste

Management and Disposal."

2. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
    1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
  1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- D. 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 workday.
- E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- F. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
  1. Construct dustproof partitions with two layers of **6-mil** polyethylene sheet on each side. Cover floor with two layers of **6-mil** polyethylene sheet, extending sheets **18 inches** up

- the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
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 through temporary partition.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

### 3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: 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 Period: 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 and replace stored or installed material that begins to grow mold.
  7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
  3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    - c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.7 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.
- 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 Section 017700 "Closeout Procedures."

END OF SECTION 015000

## SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The Work of this Section includes administrative and procedural requirements for the following:
  - 1. Recycling nonhazardous demolition and construction waste.
  - 2. Disposing of nonhazardous demolition and construction waste.

#### 1.2 DEFINITIONS

- A. CMU: Concrete masonry units.
- B. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- C. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- D. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- E. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- F. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- G. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

#### 1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice of Award. Plan must include the following:

1. Strategies to reduce the generation of waste during Project design and construction.
2. Waste diversion goals for Project, identifying the materials (both structural and nonstructural) targeted for recycling, reuse, or salvage and identifying the target diversion percentage (at least 50 percent).
3. Where materials will be taken, including expected diversion rates for each material.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use General Contractor's forms as approved by the Architect. Include the following information:
1. Material category.
  2. Generation point of waste.
  3. Total quantity of waste in **tons**.
  4. Quantity of waste salvaged, both estimated and actual in **tons**.
  5. Quantity of waste recycled, both estimated and actual in **tons**.
  6. Total quantity of waste recovered (salvaged plus recycled) in **tons**.
  7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed in accordance with EPA regulations. Include name and address of technician and date refrigerant was recovered.

#### 1.6 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

1. Firm employs a LEED Accredited Professional, certified by USGBC, as waste management coordinator.
  2. Waste management coordinator may also serve as LEED coordinator.
- B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

#### 1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan in accordance with requirements in this Section. Plan must include provisions for waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use General Contractor's forms as approved by Architect. Include estimated quantities and assumptions for estimates.

### PART 2 - PRODUCTS

#### 2.1 RECYCLING RECEIVERS AND PROCESSORS

- A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:
1. Firm licensed in the State of Rhode Island.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.
1. Construction Waste:
    - a. Masonry and CMU.
    - b. Lumber.
    - c. Wood sheet materials.
    - d. Wood trim.
    - e. Metals.
    - f. Roofing.
    - g. Insulation.
    - h. Carpet and pad.
    - i. Gypsum board.
    - j. Piping.
    - k. Electrical conduit.

1. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
  - 1) Paper.
  - 2) Cardboard.
  - 3) Boxes.
  - 4) Plastic sheet and film.
  - 5) Polystyrene packaging.
  - 6) Wood crates.
  - 7) Wood pallets.
  - 8) Plastic pails.
  
- m. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:
  - 1) Paper.
  - 2) Aluminum cans.
  - 3) Glass containers.

### PART 3 - EXECUTION

#### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during entire duration of the Contract.
  1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
  
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  1. Distribute waste management plan to everyone concerned within three days of submittal return.
  2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
  
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
  2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.



- D. Waste Management in Historic Zones or Areas: Transportation equipment and other materials are to be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by **12 inches** or more.

### 3.2 SALVAGING DEMOLITION WASTE

- A. Comply with requirements in Section 024119 "Selective Demolition" for salvaging demolition waste.
- B. Salvaged Items for Reuse in the Work: Handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until installation.
  - 4. Protect items from damage during transport and storage.
  - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for Owner's Use: Handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area on-site.
  - 5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- F. Plumbing Fixtures: Separate by type and size.
- G. Lighting Fixtures: Separate lamps by type and protect from breakage.
- H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

### 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials in accordance with recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to maximum extent practical in accordance with approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination, and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

### 3.4 RECYCLING DEMOLITION WASTE

- A. Wood Materials: Sort and stack members per size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- B. Metals: Separate metals by type.
  - 1. Structural Steel: Stack members per size, type of member, and length.
  - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- D. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- E. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- F. Conduit: Reduce conduit to straight lengths and store by material and size.
- G. Lamps: Separate lamps by type and store in accordance with requirements in 40 CFR 273.

### 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cutoffs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
  - a. Comply with requirements in Section 329300 "Plants" for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in containers and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
  - a. Comply with requirements in Section 329300 "Plants" for use of clean ground gypsum board as inorganic soil amendment.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Unless otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning:

1. Do not burn waste materials.

END OF SECTION 017419

## 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. List of incomplete items.
  - 4. Submittal of Project warranties.
  - 5. Final cleaning.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
  - 2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

#### 1.2 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Record Documents: Complete set of as-built drawings, in digital format, completed by the general contractor and associated sub trades.
- C. Operation & Maintenance: Complete digital binder of the operation and amintenance procedures for all products and equipment permanently instaled as part of the project.

- D. Warranty & Guarantee: Complete digital binder of all required product and labor warranties and guarantees as required as part of the project. All warranties and guarantees will be signed and accepted by the supplier / manufacturer with evidence of transfer to the Owner.
- E. Certificate of Insurance: For continuing coverage.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

#### 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
  - 5. Submit testing, adjusting, and balancing records.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's

- personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
  6. Advise Owner of changeover in utility services.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements.
  10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

## 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list will state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.8 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, , listed by room or space number.
  2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Contractor.
    - d. Page number.
  4. Submit list of incomplete items in the following format:
    - a. PDF Electronic File: Architect, through Construction Manager, will return annotated file.
    - b. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

## 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
1. Submit on digital media acceptable to Architect.
- 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.
- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419 "Construction Waste Management and Disposal."

#### 3.2 CORRECTION OF THE WORK

- A. Complete repair and restoration operations required by "Correction of the Work" Article in Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700



## SECTION 017839 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 017700 "Closeout Procedures" for general closeout procedures.

#### 1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of Record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one set(s) of file prints.
      - 2) Submit Record Digital Data Files and one set(s) of plots.
      - 3) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned Record Prints and three set(s) of file prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

- E. Reports: Submit written report weekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

### 1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made following Architect's written orders.
    - k. Details not on the original Contract Drawings.
    - l. Field records for variable and concealed conditions.
    - m. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as for the original Contract Drawings.
  2. Format: DWG, Version 2014 or later, Microsoft Windows operating system.
  3. Format: Annotated PDF electronic file with comment function enabled.
  4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  5. Refer instances of uncertainty to Architect for resolution.
  6. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
    - a. See Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Contractor.

#### 1.4 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. Note related Change Orders and Record Drawings where applicable.
- B. Format: Submit record specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

## 1.5 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- C. Format: Submit Record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
  - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

## 1.6 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

## 1.7 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)  
PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

## SECTION 024119 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of selected portions of exterior or interior of building or structure and site elements.
2. Removal and salvage of existing items for delivery to Owner and removal of existing items for reinstallation.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

#### 1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage; prepare for reuse; and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed.

#### 1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### 1.4 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

#### 1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - 1. Before selective demolition, Owner will remove the following items:
    - a. Vending Machines.
    - b. Brochure Stands
    - c. Office and Waiting Room furnishings
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials:
  - 1. It is not expected that hazardous materials will be encountered in the Work.
    - a. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site sale of removed items or materials is not permitted.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.
- C. Sustainable Design Requirements for Building Reuse:
  - 1. Maintain the existing building structure, envelope, and interior nonstructural elements of an abandoned or blighted building. Do not demolish such existing construction beyond indicated limits.
  - 2. Maintain the existing building structural systems where indicated to remain. Do not demolish such existing construction beyond indicated limits.
  - 3. Maintain the existing interior ceilings, interior partitions, and/or demountable walls where indicated to remain. Do not demolish such existing construction beyond indicated limits.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

### 3.2 PREPARATION

- A. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

- 1. Strengthen or add new supports when required during progress of selective demolition.

### 3.3 UTILITY SERVICES AND BUILDING SYSTEMS

- A. Existing Services/Systems to Remain: Maintain utilities and building systems and equipment to remain and protect against damage during selective demolition operations.

- 1. Maintain fire-protection facilities in service during selective demolition operations.

- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and building systems serving areas to be selectively demolished.

- 1. Arrange to shut off utilities with utility companies.
  - 2. If disconnection of utilities and building systems will affect adjacent occupied parts of the building, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
  - 3. Demolish and remove existing building systems, equipment, and components indicated on Drawings to be removed.

- a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.

- 4. Remove and reinstall/salvage existing building systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:

- a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.
    - b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove

equipment and components and deliver to Owner.

### 3.4 SALVAGE/REINSTALL

#### A. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on-site.
5. Protect items from damage during transport and storage.

#### B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

### 3.5 SELECTIVE DEMOLITION, GENERAL

#### A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 1 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.



- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

### 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete:
  - 1. Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- C. Resilient Floor Coverings: Remove floor coverings and adhesive in accordance with recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

### 3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

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END OF SECTION 024119

## SECTION 032000 - CONCRETE REINFORCING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel reinforcement bars.
  - 2. Welded-wire reinforcement.
- B. Related Requirements:

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Each type of steel reinforcement.
  - 2. Bar supports.

#### 1.3 QUALITY ASSURANCE

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
  - 1. Store reinforcement to avoid contact with earth.
  - 2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
  - 3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
  - 4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

#### 2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, **Grade 60**, deformed.
- B. Dual-Coated Reinforcing Bars: ASTM A1055/A1055M.
- C. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-

drawn steel wire into flat sheets.

## 2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, **Grade 60**, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
  - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
- C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than **0.0508 inch** in diameter.
  - 1. Finish: Plain.

## 2.4 FABRICATING REINFORCEMENT

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

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protection of In-Place Conditions:
  - 1. Do not cut or puncture vapor retarder.
  - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

### 3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
  - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
  - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than **1 inch**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

- D. Provide concrete coverage in accordance with **ACI 318**.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
  - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or **24 inches**, whichever is greater.
  - 2. Stagger splices in accordance with **ACI 318**.
  - 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
  - 4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install structural thermal break insulated connection system in accordance with manufacturer's instructions.
- H. Install welded-wire reinforcement in longest practicable lengths.
  - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
    - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed **12 inches**.
  - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches** for plain wire and **8 inches** for deformed wire.
  - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
  - 4. Lace overlaps with wire.
- I. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.
- J. Dual-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.
- K. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material in accordance with ASTM A780/A780M.

### 3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement.
  - 2. Continue reinforcement across construction joints unless otherwise indicated.
  - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with **ACI 117**.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a [**special inspector**][**and**][**qualified testing and inspecting agency**] to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
1. Steel-reinforcement placement.
  2. Steel-reinforcement mechanical splice couplers.
  3. Steel-reinforcement welding.
- D. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 032000

## SECTION 033000 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Concrete materials.
2. Vapor retarders.

B. Related Requirements:

1. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

#### 1.2 DEFINITIONS

A. Cementitious Materials: Portland cement or blended hydraulic cement alone or in combination with one or more of the following:

1. Fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cementitious Materials (w/cm) Ratio: The ratio by weight of mixing water to cementitious materials.

#### 1.3 ACTION SUBMITTALS

A. Product Data:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Silica fume.
5. Natural or other pozzolans.
6. Aggregates.
7. Vapor retarders.
8. Floor and slab treatments.
9. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Compressive strength at 28 days or other age as specified.
3. Compressive strength required at stages of construction.

4. Durability exposure classes for Exposure Categories F, S, W, and C.
5. Maximum w/cm ratio.
6. Calculated equilibrium and fresh density for lightweight concrete.
7. Slump or slump flow limit.
8. Air content.
9. Nominal maximum aggregate size.
10. Intended placement method.
11. Submit adjustments to design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant changes.

#### 1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
  1. Include the following information in each test report:
    - a. Admixture dosage rates.
    - b. Slump.
    - c. Air content.
    - d. Seven-day compressive strength.
    - e. 28-day compressive strength.
    - f. Evaluation of permeability-reducing admixtures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and **ACI 301**.

#### 1.6 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with **ACI 301** as follows:
  1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  2. When air temperature has fallen to, or is expected to fall below **40 deg F** during the protection period, maintain delivered concrete mixture temperature within the temperature range required by **ACI 301**.
  3. Do not use frozen materials or materials containing ice or snow.
  4. Do not place concrete in contact with surfaces less than **35 deg F**, other than reinforcing steel.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE STANDARDS

- A. ACI Publications: Comply with **ACI 301** unless modified by requirements in the Contract



Documents.

## 2.2 CONCRETE MATERIALS

### A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type of admixture from single source from single manufacturer.

### B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I, gray.
2. Blended Hydraulic Cement: ASTM C595/C595M, Type IP, Portland-pozzolan cement.
3. Pozzolans: ASTM C618, Class C, F, or N.
4. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
5. Ground Glass Pozzolan: ASTM C1866/C1866M, Type GS or GE.

### C. Normal-Weight Aggregates:

1. Coarse Aggregate: ASTM C33/C33M, Class 3M
2. Maximum Coarse-Aggregate Size: **3/4 inch** nominal.
3. Fine Aggregate: ASTM C33/C33M.
4. Recycled Aggregate: Provide documentation of characteristics of recycled aggregate and mechanical properties and durability of proposed concrete, which incorporates recycled aggregate to conform to applicable requirements for the class of concrete.

### D. Lightweight Aggregate: ASTM C330/C330M, **3/8-inch** nominal maximum aggregate size.

1. Limit lightweight aggregate for internal curing to prewetted lightweight fine aggregate in accordance with ASTM C1761/C1761M.

## 2.3 CURING MATERIALS

### A. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

#### 1. Color:

- a. Ambient Temperature Below 50 deg F (10 deg C): Black.
- b. Ambient Temperature between 50 and 85 deg F (10 and 29 deg C): Any color.
- c. Ambient Temperature Above 85 deg F (29 deg C): White.

### B. Water: Potable water that does not cause staining of the surface.

## 2.4 ACCESSORIES

### A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

## 2.5 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 C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, **1/8 to 1/4 inch** or coarse sand, as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than **4100 psi** at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from **1/4 inch** and that can be filled in over a scarified surface to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, **1/8 to 1/4 inch** or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than **5000 psi** at 28 days when tested in accordance with ASTM C109/C109M.

## 2.6 CONCRETE MIXTURE MATERIALS

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301**.
  - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

## 2.7 CONCRETE MIXTURE CLASS TYPES

- A. Class C: Normal-weight concrete used for interior slabs-on-ground.
  - 1. Exposure Class: **ACI 318** Class F1.
  - 2. Minimum Compressive Strength: **4000 psi** at 28 days.

## SECTION 035413 - GYPSUM CEMENT UNDERLAYMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Self-leveling, gypsum cement underlayment for application below interior floor coverings.

#### 1.2 ACTION SUBMITTALS

##### A. Product Data: For the following:

1. Gypsum cement underlayment.
2. Reinforcement.
3. Primer.
4. Corrosion-resistant coating.
5. Surface sealer.

#### 1.3 QUALITY ASSURANCE

- ##### A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

#### 1.4 FIELD CONDITIONS

- ##### A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between **50 and 80 deg F**.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

#### 2.2 GYPSUM CEMENT UNDERLAYMENTS

- ##### A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in minimum uniform thickness of **1/8 inch** to match adjacent floor elevations.

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. ARDEX Americas
    - b. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
    - c. MAPEI Corporation
    - d. Maxxon Corporation
    - e. USG Corporation
  2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C219.
  3. Compressive Strength: Not less than **2500 psi** at 28 days when tested according to ASTM C472.
  4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, **1/8 to 1/4 inch**; or coarse sand as recommended by underlayment manufacturer.
1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than **70 deg F**.
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- a. Low-Emitting Materials: VOC emissions shall comply with the 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." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
  - b. Low-Emitting Materials: VOC emissions shall comply with the 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."
- F. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.
- a. Low-Emitting Materials: VOC emissions shall comply with the 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." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
  - b. Low-Emitting Materials: VOC emissions shall comply with the 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."

- G. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare and clean substrate according to manufacturer's written instructions.
  - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
- C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond; prepare surfaces according to manufacturer's written instructions.
- D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Mix and install underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment installation and for time period after installation recommended in writing by manufacturer.
  - 2. Coordinate installation of components to provide optimum adhesion to substrate and between coats.
  - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Install underlayment to produce uniform, level surface.

1. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during installation and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

### 3.4 INSTALLATION TOLERANCES

- A. Finish and measure surface, so gap at any point between gypsum cement underlayment surface and an unlevelled, freestanding, **10-foot-** long straightedge resting on two high spots and placed anywhere on the surface does not exceed **1/8 inch** and **1/16 inch** in **2 feet**.

### 3.5 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035413

3. Air Content:
  - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
4. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

## 2.8 CONCRETE MIXING

- A. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
  1. For mixer capacity of **1 cu. yd.** or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
  2. For mixer capacity larger than **1 cu. yd.**, increase mixing time by 15 seconds for each additional **1 cu. yd.**
  3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification of Conditions:
  1. Before placing concrete, verify that installation of concrete forms, accessories, reinforcement, and embedded items is complete and that required inspections have been performed.
  2. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
  1. Daily access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
  4. Security and protection for test samples and for testing and inspection equipment at Project site.

### 3.3 TOLERANCES

- A. Comply with **ACI 117**.

### 3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
  - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

### 3.5 INSTALLATION OF VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
  - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
  - 2. Face laps away from exposed direction of concrete pour.
  - 3. Seal penetrations in accordance with vapor retarder manufacturer's instructions.

### 3.6 INSTALLATION OF CAST-IN-PLACE CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
  - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
  - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
  - 1. If a section cannot be placed continuously, provide construction joints as indicated.
  - 2. Deposit concrete to avoid segregation.
  - 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Do not place concrete floors and slabs in a checkerboard sequence.
  - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.



3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

### 3.7 APPLICATION OF FINISHING FLOORS AND SLABS

- A. Trowel and Fine-Broom Finish: First apply a trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
  2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

### 3.8 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling in:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
  2. Mix, place, and cure concrete, as specified, to match color and texture with in-place construction exposed to view.
  3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

### 3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency to be responsible for providing curing facility for initial curing of strength test specimens on-site and verifying that test specimens are cured in accordance with standard curing requirements in ASTM C31/C31M.
  2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
  3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
    - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and **ACI 301**, including the following as applicable to each test and inspection:
      - 1) Project name.
      - 2) Name of testing agency.
      - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.

- 4) Name of concrete manufacturer.
- 5) Date and time of inspection, sampling, and field testing.
- 6) Date and time of concrete placement.
- 7) Location in Work of concrete represented by samples.
- 8) Date and time sample was obtained.
- 9) Truck and batch ticket numbers.
- 10) Design compressive strength at 28 days.
- 11) Concrete mixture designation, proportions, and materials.
- 12) Type of fracture and compressive break strengths at seven days and 28 days.

B. Delivery Tickets: comply with ASTM C94/C94M.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Compressive-Strength Tests: ASTM C39/C39M.

- a. Test one set of two standard cured specimens at seven days and one set of two specimens at 28 days.

### 3.10 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Prohibit placement of steel items on concrete surfaces.

END OF SECTION 033000

## SECTION 035413 - GYPSUM CEMENT UNDERLAYMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Self-leveling, gypsum cement underlayment for application below interior floor coverings.

#### 1.2 ACTION SUBMITTALS

##### A. Product Data: For the following:

1. Gypsum cement underlayment.
2. Reinforcement.
3. Primer.
4. Corrosion-resistant coating.
5. Surface sealer.

#### 1.3 QUALITY ASSURANCE

- ##### A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

#### 1.4 FIELD CONDITIONS

- ##### A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between **50 and 80 deg F**.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

#### 2.2 GYPSUM CEMENT UNDERLAYMENTS

- ##### A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in minimum uniform thickness of **1/8 inch** to match adjacent floor elevations.

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. ARDEX Americas
    - b. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
    - c. MAPEI Corporation
    - d. Maxxon Corporation
    - e. USG Corporation
  2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C219.
  3. Compressive Strength: Not less than **2500 psi** at 28 days when tested according to ASTM C472.
  4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, **1/8 to 1/4 inch**; or coarse sand as recommended by underlayment manufacturer.
1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than **70 deg F**.
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- a. Low-Emitting Materials: VOC emissions shall comply with the 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." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
  - b. Low-Emitting Materials: VOC emissions shall comply with the 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."
- F. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.
- a. Low-Emitting Materials: VOC emissions shall comply with the 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." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
  - b. Low-Emitting Materials: VOC emissions shall comply with the 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."

- G. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare and clean substrate according to manufacturer's written instructions.
  - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
- C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond; prepare surfaces according to manufacturer's written instructions.
- D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Mix and install underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment installation and for time period after installation recommended in writing by manufacturer.
  - 2. Coordinate installation of components to provide optimum adhesion to substrate and between coats.
  - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Install underlayment to produce uniform, level surface.

1. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during installation and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

### 3.4 INSTALLATION TOLERANCES

- A. Finish and measure surface, so gap at any point between gypsum cement underlayment surface and an unlevelled, freestanding, **10-foot-** long straightedge resting on two high spots and placed anywhere on the surface does not exceed **1/8 inch** and **1/16 inch** in **2 feet**.

### 3.5 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035413

## SECTION 061000 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Wood products.
2. Wood-preservative-treated lumber.
3. Fire-retardant-treated lumber.
4. Dimension lumber framing.
5. Miscellaneous lumber.
6. Plywood backing panels.

##### B. Related Requirements:

1. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.

#### 1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than **2 inches nominal** size in least dimension.

B. Dimension Lumber: Lumber of **2 inches nominal** size or greater but less than **5 inches nominal** size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. Lumber grading agencies, and abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. SPIB: The Southern Pine Inspection Bureau.
4. WCLIB: West Coast Lumber Inspection Bureau.
5. WWPA: Western Wood Products Association.

#### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include

physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5664.

#### 1.4 INFORMATIONAL SUBMITTALS

##### A. Material Certificates:

1. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

#### 1.5 QUALITY ASSURANCE

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- ##### A.
- Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

#### 2.1 WOOD PRODUCTS

- ##### A. Lumber:
- Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

##### B. Maximum Moisture Content:

1. Boards: 19 percent.
2. Dimension Lumber: 19 percent unless otherwise indicated.

#### 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- ##### A. Preservative Treatment by Pressure Process: AWP A U1, Use categories as follows:

1. UC1: Interior construction not in contact with ground or subject to moisture. Include all rough carpentry.
  - a. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.



- b. Wood floor plates that are installed over concrete slabs-on-grade.
  - c. Wood millwork.
  - d. <Insert item>.
2. UC4B (Commodity Specification A): Critical or difficult-to-replace sawn products in contact with ground and exposed to all weather cycles including continuous or prolonged wetting, high decay potential, and salt water splash. Include **[all rough carpentry.]****[the following items:]**
    - a. <Insert item>.
  3. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

### 2.3 FIRE-RETARDANT-TREATED LUMBER

- A. General: Where fire-retardant-treated materials are indicated, materials are to comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet** beyond the centerline of the burners at any time during the test.
  1. Treatment is not to promote corrosion of metal fasteners.
  2. Interior Type A: Treated materials are to have a moisture content of 28 percent or less when tested in accordance with ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
  3. Design Value Adjustment Factors: Treated lumber is to be tested according to ASTM D5664 and design value adjustment factors are to be calculated according to ASTM D6841.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency and other information required by authorities having jurisdiction.
- E. Application: Treat items indicated on Drawings, and the following:
  1. Concealed blocking.
  2. Plywood backing panels.

## 2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions by Grade: Construction or No. 2 grade.
1. Application: All interior partitions.
  2. Species:
    - a. Hem-fir (north); NLGA.
    - b. Spruce-pine-fir; NLGA.
    - c. Hem-fir; WCLIB, or WWPA.
    - d. Northern species; NLGA.
- B. Load-Bearing Partitions by Grade: No. 2 grade.
1. Application: interior load-bearing partitions.
  2. Species:
    - a. Hem-fir (north); NLGA.
    - b. Spruce-pine-fir; NLGA.
    - c. Hem-fir; WCLIB or WWPA.
- C. Machine Stress-Rated (MSR) Lumber Partitions: Any species of MSR dimension lumber with a grade of not less than 2100f-1.8E.
1. Application: interior load-bearing partitions.
- D. Load-Bearing Partitions by Performance: Any species and grade with a modulus of elasticity of at least **1,100,000 psi** and an extreme fiber stress in bending of at least **700 psi** for **2-inch nominal** thickness and **12-inch nominal** width for single-member use.
1. Application: interior load-bearing partitions.
- E. Ceiling Joists: Construction or No. 2 grade.
1. Species:
    - a. Hem-fir (north); NLGA.
    - b. Douglas fir-larch (north); NLGA.
    - c. Spruce-pine-fir; NLGA.
    - d. Hem-fir; WCLIB or WWPA.
    - e. Northern species; NLGA.
- F. Joists, Rafters, and Other Framing by Grade: No. 2 grade.
1. Species:
    - a. Hem-fir (north); NLGA.
    - b. Spruce-pine-fir; NLGA.
    - c. Hem-fir; WCLIB or WWPA.
- G. Joists, Rafters, and Other Framing by Performance: Any species and grade with a modulus of

elasticity of at least **1,100,000 psi** and an extreme fiber stress in bending of at least **700 psi** for **2-inch nominal** thickness and **12-inch nominal** width for single-member use.

## 2.5 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
  2. Nailers.
  3. Utility shelving.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
1. Hem-fir (north); NLGA.
  2. Spruce-pine-fir; NLGA.
  3. Hem-fir; WCLIB or WWPA.
  4. Northern species; NLGA.
- C. Utility Shelving: Lumber with 19 percent maximum moisture content of any of the following species and grades:
1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
  2. Mixed southern pine or southern pine; No. 2 grade; SPIB.
  3. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
  4. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
  2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
  3. Northern species; No. 2 Common grade; NLGA.
- E. Roofing Nailers: Structural- or No. 2-grade lumber or better; kiln-dried Douglas fir, southern pine, or wood having similar decay-resistant properties.
- F. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than **3/4-inch** nominal thickness.

## 2.7 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than **1-1/2 inches** into wood substrate.
  - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or ASTM F2329.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches** o.c.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and

as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than **96 inches** o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than **96 inches** o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and **2-inch nominal** thickness.
- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code (IBC).
- J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- 3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS
- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
  - B. Attach wood blocking to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- 3.3 INSTALLATION OF WOOD FURRING
- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
  - B. Furring to Receive Gypsum Board or Plaster Lath: Install **1-by-2-inch nominal**- size furring vertically at **16 inches** o.c.
- 3.4 INSTALLATION OF WALL AND PARTITION FRAMING
- A. General: Provide single bottom plate and double top plates using members of **2-inch nominal** thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. For exterior walls, provide **2-by-6-inch nominal**- size wood studs spaced **16 inches** o.c. unless otherwise indicated.
  2. For interior partitions and walls, provide **2-by-4-inch nominal**- size wood studs spaced **16 inches** o.c. unless otherwise indicated.
  3. Provide continuous horizontal blocking at midheight of partitions more than **96 inches** high, using members of **2-inch nominal** thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs[, **except that two studs may be used for interior non-load-bearing partitions**].
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
1. For non-load-bearing partitions, provide double-jamb studs and headers not less than **4-inch nominal** depth for openings **48 inches** and less in width, **6-inch nominal** depth for openings **48 to 72 inches** in width, **8-inch nominal** depth for openings **72 to 120 inches** in width, and not less than **10-inch nominal** depth for openings **10 to 12 feet** in width.
  2. For load-bearing walls, provide double-jamb studs for openings **60 inches** and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

END OF SECTION 061000

## SECTION 061600 - SHEATHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Subflooring and underlayment.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.

#### 1.2 ACTION SUBMITTALS

A. Product Data:

1. Subflooring and underlayment.

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

#### 2.1 WOOD PANEL PRODUCTS

- A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- B. Factory mark panels to indicate compliance with applicable standard.

#### 2.2 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exposure 1, Structural I, Underlayment single-floor panels.
1. Span Rating: Not less than 24.
  2. Nominal Thickness: Not less than **23/32 inch**.
  3. Edge Detail: Square.

4. Surface Finish: Fully sanded face.
- B. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than **1/4 inch** over smooth subfloors and not less than **3/8 inch** over board or uneven subfloors.
1. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exposure 1 Underlayment with fully sanded face.
  2. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, not less than **5/8-inch** nominal thickness.

## 2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

## 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 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
  2. ICC-ES evaluation report for fastener.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials.



Make tight connections. Install fasteners without splitting wood.

- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.2 INSTALLATION OF WOOD STRUCTURAL PANEL

- 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. Combination Subfloor-Underlayment:
    - a. Glue and nail to wood framing.
    - b. Space panels **1/8 inch** apart at edges and ends.
  - 2. Subflooring:
    - a. Glue and nail to wood framing.
    - b. Space panels **1/8 inch** apart at edges and ends.
  - 3. Wall and Roof Sheathing:
    - a. Nail to wood framing.
    - b. Space panels **1/8 inch** apart at edges and ends.
  - 4. Underlayment:
    - a. Nail to subflooring.
    - b. Space panels **1/32 inch** apart at edges and ends.
    - c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

END OF SECTION 061600

## SECTION 062023 - INTERIOR FINISH CARPENTRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Interior trim.
2. Paneling.
3. Shelving and clothes rods.
4. Acoustic Slatted Wall Panel

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
2. Section 064023 "Interior Architectural Woodwork" for shop-fabricated carpentry.

#### 1.2 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.
- C. PVC: Polyvinyl chloride.

#### 1.3 ACTION SUBMITTALS

A. Product Data:

1. Interior trim.
2. Paneling.
3. Acoustic Slatted Wall Panel

B. Product Data Submittals: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

C. Samples: For each exposed product and for each color and texture specified.

D. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

E. Samples for Verification:

1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished; **50 sq. in.** for lumber and **8 by 10 inches** for panels.
2. For each finish system and color of lumber and panel products with factory-applied finish, **50 sq. in.** for lumber and **8 by 10 inches** for panels.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
  1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
  2. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

#### 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS, GENERAL

- A. Regional Materials: The following wood products shall be manufactured within **500 miles** of Project site.
  1. Interior trim.
  2. Interior board paneling.
    - a. Salvaged wall board surfacing for reinstallation
    - b. Acoustic slatted wood wall paneling
  3. Shelving.

- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
- C. Softwood Plywood: DOC PS 1.
- D. Hardboard: ANSI A135.4.
- E. MDF: ANSI A208.2, Grade 130.
- F. Particleboard: ANSI A208.1, Grade M-2.

## 2.2 INTERIOR TRIM

- A. Lumber Trim for Opaque Finish (Painted Finish):
  - 1. Species and Grade:
    - a. Eastern white pine; NeLMA or NLGA Finish or 1 Common.
    - b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA 1 Common (Colonial).
    - c. White woods; WWPA 1 Common.
  - 2. Maximum Moisture Content for Softwoods: 15 percent.
  - 3. Finger Jointing: Not allowed.
  - 4. Face Surface: Surfaced (smooth).

## 2.3 PANELING

- A. Hardboard Paneling: Interior factory-finished hardboard paneling complying with ANSI A135.5.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Acoustic Slatted Wood Wall Panel or comparable product by one of the following:
    - a. Georgia-Pacific Gypsum LLC
    - b. WVH - Wood Veneer Hub
  - 2. Thickness: **1/4 inch**.
  - 3. Finish: Class I.
  - 4. Surface-Burning Characteristics: As follows, tested according to ASTM E84:
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.

5. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

B. Board Paneling, MMPA: Interior wood-board paneling complying with MMPA WM 9.

1. Species: [Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine][Southern pine][Western red cedar][Figured red gum]<Insert species>.
2. Grade: [Clear No. 1][Clear No. 2][Knotty No. 1][Knotty No. 2][Finger jointed].
3. Maximum Moisture Content: [15 percent with at least 85 percent of shipment at 12 percent or less][9 percent].
4. Pattern: [V-joint, tongue and groove, PT 82][Beaded ceiling, PT 85][Beveled-edge channel, shiplapped, PT 82][As indicated].
5. Net Coverage Width: Not less than [5-1/16 inches][6-3/4 inches][8-3/4 inches].

C. Board Paneling:

1. Species and Grade:
  - a. Eastern white pine; NeLMA or NLGA [C Select][D Select][Finish or 1 Common][Premium or 2 Common].
  - b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA [C Select (Choice)][D Select (Quality)][1 Common (Colonial)][2 Common (Sterling)].
  - c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA [C Select (Choice)][D Select (Quality)][Finish or 1 Common (Colonial)][Premium or 2 Common (Sterling)].
  - d. Southern pine; SPIB [B & B][C & Btr][No. 2] Paneling.
  - e. Western red cedar; NLGA, WCLIB, or WWPA [Clear Heart][Grade A][Grade B].
2. Maximum Moisture Content: [19][15] percent[ with at least 85 percent of shipment at 12 percent or less].
3. Pattern:
  - a. V-joint, tongue and groove, [NeLMA EWP 4][SPIB SPP 54][or][WWPA WP 4].
  - b. Pickwick, tongue and groove, [NeLMA EWP 2][SPIB SPP 52][or][WWPA WP 2].
  - c. Rounded-edge channel groove, tongue and groove, [SPIB SPP 60][or][WWPA WP 6].
  - d. Edge and center bead, tongue and groove, [NeLMA E & CB][or][WWPA E & CB Ceiling].
4. Net Coverage Width: Not less than [5-1/16 inches][6-3/4 inches][8-3/4 inches].

## 2.4 SHELVING AND CLOTHES RODS

A. Shelving: Utility shelving, made from the following material, 3/4 inch thick:

1. MDF with radiused front edge.
2. MDO softwood plywood with solid-wood edge.
3. Softwood Boards:
  - a. Kiln-dried Douglas fir-larch, Douglas fir south, or hem-fir; SPIB [Superior or C &

**Btr**[Prime or D] finish; NLGA, WCLIB, or WWPA; or southern pine; **[B & B]**[C] finish.

- B. Standards for Adjustable Shelf Supports: BHMA A156.9, B04071; zinc-plated steel.

## 2.5 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- C. Installation Adhesive for Foam-Plastic Moldings: Product recommended for indicated use by foam-plastic molding manufacturer.
- D. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.
- E. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

## 2.6 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work:
  - 1. Interior standing and running trim, except shoe and crown molds.
  - 2. Wood-board paneling.
- B. Ease edges of lumber less than **1 inch** in nominal thickness to **1/16-inch** radius and edges of lumber **1 inch** or more in nominal thickness to **1/8-inch** radius.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

### 3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
  - 1. Use concealed shims where necessary for alignment.
  - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
  - 4. Install to tolerance of **1/8 inch in 96 inches** 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.
  - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

### 3.4 INSTALLATION OF PANELING

- A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels.
  - 1. Leave **1/4-inch** gap to be covered with trim at top, bottom, and openings.
  - 2. Install with uniform tight joints between panels.
  - 3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.
  - 4. Space fasteners and adhesive as recommended by panel manufacturer.
  - 5. Conceal fasteners to greatest practical extent.
  - 6. Arrange panels with grooves and joints over supports.
    - a. Fasten to supports with nails of type and at spacing recommended by panel manufacturer.
    - b. Use fasteners with prefinished heads matching groove color.
- B. Hardboard Paneling: Install according to manufacturer's written instructions.
  - 1. Leave **1/4-inch** gap to be covered with trim at top, bottom, and openings.
  - 2. Butt adjacent panels with moderate contact.

3. Use fasteners with prefinished heads matching paneling color.
4. Wood Stud or Furring Substrate: Install with **1-inch** annular-ring shank hardboard nails.
5. Plaster or Gypsum-Board Substrate: Install with **1-5/8-inch** annular-ring shank hardboard nails.
6. Nailing: Space nails **4 inches** o.c. at panel perimeter and **8 inches** o.c. at intermediate supports unless otherwise required by manufacturer.

C. Board Paneling: Install according to manufacturer's written instructions.

1. Arrange in random-width pattern suggested by manufacturer unless boards or planks are of uniform width.
2. Install in full lengths without end joints.
3. Stagger end joints in random pattern to uniformly distribute joints on each wall.
4. Install with uniform end joints with only end-matched (tongue-and-groove) joints within each field of paneling.
5. Install with uniform end joints. Locate end joints only over furring or blocking.
6. Select and arrange boards on each wall to minimize noticeable variations in grain character and color between adjacent boards.
7. Install with uniform tight joints between boards.
8. Fasten paneling by face nailing, setting nails, and filling over nail heads.
9. Fasten paneling with trim screws, set below face and filled.
10. Fasten paneling by blind nailing through tongues.
11. Fasten paneling with paneling system manufacturer's concealed clips.
12. Fasten paneling to gypsum wallboard with panel adhesive.

### 3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements.
1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

### 3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

### 3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
1. Indications that materials are wet or moisture damaged include, but are not limited to,



- discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

## SECTION 072100 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Molded (expanded) polystyrene foam-plastic board insulation.
2. Mineral-wool blanket insulation.

B. Related Requirements:

1. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

#### 1.2 ACTION SUBMITTALS

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

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than Class A, 25 and 450 when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Labeling: Provide identification of mark indicating R-value of each piece of insulation **12 inches** and wider in width.

## 2.2 MINERAL-WOOL BLANKET INSULATION

- A. Mineral-Wool Blanket Insulation, Unfaced: ASTM C665, Type I (blankets without membrane facing); consisting of fibers; complying with ASTM E136 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. Owens Corning
    - c. ROCKWOOL

## 2.3 INSULATION FASTENERS

- A. Insulation Fastener Accessories: Provide double-pointed weld pins, lagging pins, quilting pins, duct liner pins, insulation hangers, specialty washers, special caps, j-hooks, capacitor discharge annular weld pins, capacitor discharge acoustical lagging pins, and other accessory materials that are recommended in writing by insulation fastener manufacturer to produce complete insulation supports.

## 2.4 ACCESSORIES

# PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or those that interfere with insulation attachment.

## 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or

required to make up total thickness or to achieve R-value.

### 3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  3. Maintain **3-inch** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  4. For wood-framed construction, install blankets in accordance with ASTM C1320 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.

### 3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

## SECTION 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. Immersible joint sealants.
5. Silane-modified polymer joint sealants.
6. Mildew-resistant joint sealants.
7. Polysulfide joint sealants.
8. Butyl joint sealants.
9. Latex joint sealants.

#### 1.2 ACTION SUBMITTALS

##### A. Product Data:

1. Silicone joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.

- B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- B. Field Quality-Control Reports: For field-adhesion-test reports, for each sealant application tested.
- C. Sample warranties.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Manufacturers' special warranties.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.

## 1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 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**]<Insert number> 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**]<Insert number> years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  2. Disintegration of joint substrates from causes exceeding design specifications.
  3. Mechanical damage caused by individuals, tools, or other outside agents.
  4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

## 2.2 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.3 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
  - 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. Sika Corporation - Building Components
    - b. Tremco, Inc.

## 2.4 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

## 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.

## 2.6 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Unglazed surfaces of ceramic tile.
    - c. Wood.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.
    - e. <Insert other nonporous joint substrate>.



- B. **Joint Priming:** Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. **General:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. **Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.**
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. **Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.**
- E. **Install sealants using proven techniques that comply with the following and at the same time backings are installed:**
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. **Tooling of Nonsag Sealants:** Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.
  - 4. Provide flush joint profile at locations indicated on Drawings in accordance with Figure 8B in ASTM C1193.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Interior standard steel doors and frames.

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

#### 1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

#### 1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

#### 1.4 ACTION SUBMITTALS

A. Product Data:

1. Interior standard steel doors and frames.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.
  6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
  7. Details of anchorages, joints, field splices, and connections.
  8. Details of accessories.
  9. Details of moldings, removable stops, and glazing.
- D. Samples for Initial Selection: For hollow-metal doors and frames with factory-applied color finishes.
- E. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

## 1.5 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum **4-inch** high wood blocking. Provide minimum **1/4-inch** space between each stacked door to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 HOLLOW METAL DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, **[provide products by the following][provide products by one of the following][available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
1. **[Airtec Corporation]**
  2. **[Apex Industries, Inc]**
  3. **[BARON Metal Industries, Inc.; ASSA ABLOY of Canada, Ltd.; ASSA ABLOY]**
  4. **[Ceco Door; AADG, Inc.; ASSA ABLOY]**
  5. **[Concept Frames, AADG, Inc.; ASSA ABLOY Group]**
  6. **[Curries, AADG, Inc.; ASSA ABLOY Group]**

7. [Custom Metal Products]
8. [Daybar Industries, Ltd]
9. [DCI Hollow Metal on Demand]
10. [DE LA FONTAINE]
11. [Deansteel Manufacturing Company, Inc.]
12. [Deronde Products]
13. [DKS Steel Door & Frame Systems, Inc.]
14. [Expi-Door Systems, Inc.]
15. [Fleming Door Products Ltd.; ASSA ABLOY Group]
16. [Gensteel Doors]
17. [HMF Express]
18. [Hollow Metal Xpress]
19. [JR Metal Frames, Inc.]
20. [Karpen Steel Custom Doors & Frames]
21. [L.I.F. Industries, Inc]
22. [LaForce, LLC]
23. [MegaMet Industries]
24. [Mesker Door; Mesker Openings Group]
25. [Metropolitan Door Industries Corp.]
26. [Michbi Doors Inc]
27. [MPI Group, LLC (The)]
28. [National Custom Hollow Metal Doors & Frames]
29. [North American Door Corp]
30. [Philipp Manufacturing Co (The)]
31. [Pioneer Industries; AADG, Inc.; ASSA ABLOY]
32. [Premier Products, Inc]
33. [Republic Doors and Frames; a Allegion brand]
34. [Rocky Mountain Metals, Inc]
35. [Security Metal Products; a brand of ASSA ABLOY]
36. [Steelcraft; Allegion plc]
37. [Steward Steel, Door & Frame Division]
38. [Stiles Custom Metal, Inc]
39. [Titan Metal Products]
40. [Trillium Steel Doors Limited]
41. [West Central Manufacturing, Inc.]
42. <Insert manufacturer's name>

## 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

## 2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as

specified.

- B. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C. At locations indicated in the Door and Frame Schedule on Drawings.
1. Doors:
    - a. Type: As indicated in the Door and Frame Schedule on Drawings.
    - b. Thickness: **1-3/4 inches**.
    - c. Face: Uncoated steel sheet, minimum thickness of **0.032 inch**.
    - d. Edge Construction: Model 1, Full Flush.
    - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
    - f. Core: Manufacturer's standard.
    - g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.
  2. Frames:
    - a. Materials: Uncoated steel sheet, minimum thickness of **0.042 inch**.
    - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
    - c. Construction: Face welded.
  3. Exposed Finish: Prime.

## 2.4 FRAME ANCHORS

- A. Jamb Anchors:
1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
  2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each **24 inches** of frame height above **7 feet**.
  3. Postinstalled Expansion Anchor: Minimum **3/8-inch**- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Material: ASTM A879/A879M, Commercial Steel (CS), **04Z** coating designation; mill phosphatized.

## 2.5 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- E. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- F. Glazing: Comply with requirements in Section 088000 "Glazing."

## 2.6 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum **3/4 inch** beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
  - 1. Sidelite 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 welding.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.
  - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
  - 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than **9 inches** o.c. and not more than **2 inches** o.c. from each corner.

## 2.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 2.8 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of **0.020-inch-** thick, cold-rolled steel sheet set into **0.032-inch-** thick steel frame.
  1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.



1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    - b. Install frames with removable stops located on secure side of opening.
  2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
  3. Floor Anchors: Secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  4. Solidly pack mineral-fiber insulation inside frames.
  5. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
    - a. Squareness: Plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus **1/16 inch**, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
  2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
  3. Smoke-Control Doors: Install doors in accordance with NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

### 3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

## SECTION 081416 - FLUSH WOOD DOORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Solid-core five-ply flush wood veneer-faced doors and transom panels for transparent finish.
2. Solid-core flush wood doors and transom panels with plastic-laminate-faces.
3. Hollow-core flush wood doors with plastic-laminate faces.
4. Light frames and louvers.

##### B. Related Requirements:

1. Section 064023 "Interior Architectural Woodwork" for wood door frames[ **including 20-minute fire-rated wood door frames**].
2. Section 064216 "Flush Wood Paneling" for requirements for veneers from the same flitches for both flush wood doors and flush wood paneling.
3. Section 083473.16 "Wood Sound Control Door Assemblies" for acoustic flush wood doors.
4. Section 088000 "Glazing" for glass view panels in flush wood doors.
5. [Section 099113 "Exterior Painting"] [Section 099123 "Interior Painting"] [and] [Section 099300 "Staining and Transparent Finishing"] for field finishing doors.
6. Section 134900 "Radiation Protection" for lead-lined flush wood doors.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at [Project site]<Insert location>.

#### 1.3 ACTION SUBMITTALS

##### A. Product Data:

1. Solid-core five-ply flush wood veneer-faced doors and transom panels for transparent finish.
2. Solid-core five-ply flush wood doors and transom panels for opaque finish.
3. Solid-core seven-ply flush wood veneer-faced doors and transom panels for transparent finish.
4. Solid-core seven-ply flush wood doors and transom panels for opaque finish.
5. Solid-core flush wood doors and transom panels with plastic-laminate-faces.
6. Hollow-core flush wood veneer-faced doors for transparent finish.
7. Hollow-core flush wood doors for opaque finish.
8. Hollow-core flush wood doors with plastic-laminate faces.
9. Fire-rated wood door frames.

10. Light frames and louvers.
- B. Product Data Submittals: For each product, including the following:
1. Door core materials and construction.
  2. Door edge construction
  3. Door face type and characteristics.
  4. Door louvers.
  5. Door trim for openings.
  6. Door frame construction.
  7. Factory-machining criteria.
  8. Factory-~~priming~~**[finishing]** specifications.
- C. Sustainable Design Submittals:
1. Third-Party Certifications: For each product.
  2. Third-Party Certified Life Cycle Assessment: For each product.
  3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
- D. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
1. Door schedule indicating door ~~and frame~~ location, type, size, fire protection rating, and swing.
  2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
  3. Details of frame for each frame type, including dimensions and profile.
  4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
  5. Dimensions and locations of blocking for hardware attachment.
  6. Dimensions and locations of mortises and holes for hardware.
  7. Clearances and undercuts.
  8. Requirements for veneer matching.
  9. Doors to be factory ~~primed~~**[finished]** and application requirements.
  10. Apply ~~AWI Quality Certification~~**[WI Certified Compliance]** Program label to Shop Drawings.
- E. Samples for Initial Selection: For ~~plastic-laminate door faces~~~~polymer edging~~~~factory-finished doors~~~~and~~~~factory-finished door frames~~.
- F. Samples for Verification:
1. Factory finishes applied to actual door face materials, approximately **8 by 10 inches**, for each material and finish. **[ For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.]**
  2. Plastic laminate, **6 inches** square, for each color, texture, and pattern selected.
  3. Polymer edging, in manufacturer's standard colors.
  4. Corner sections of doors, approximately **8 by 10 inches**, with door faces and edges representing actual materials to be used.
  5. Louver blade and frame sections, **6 inches** long, for each material and finish specified.
  6. Frames for light openings, **6 inches** long, for each material, type, and finish required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
  - 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
  - 2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
  - 3. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.
- B. Field quality-control reports.
- C. Sample Warranty: For special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Quality Standard Compliance Certificates: **[AWI Quality Certification][WI Certified Compliance]** Program certificates.
- C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer's Certification: Licensed participant in **[AWI's Quality Certification Program][WI's Certified Compliance Program]**.
- B. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
  - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.
- C. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
  - 1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in **[plastic bags or cardboard cartons][cardboard cartons, and wrap bundles of doors in plastic sheeting]**.

- C. Mark each door on[ **top and**] bottom rail with opening number used on Shop Drawings.

## 1.8 FIELD CONDITIONS

### A. Environmental Limitations:

1. Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.
2. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between **60 and 90 deg F** and relative humidity between [25 and 55][43 and 70][17 and 50]<Insert numbers> percent during remainder of construction period.

## 1.9 WARRANTY

### A. Special Warranty: Manufacturer agrees to repair or replace doors[ **and frames**] that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Delamination of veneer.
  - b. Warping (bow, cup, or twist) more than **1/4 inch** in a **42-by-84-inch** section.
  - c. Telegraphing of core construction in face veneers exceeding **0.01 inch in a 3-inch** span.
2. Warranty also includes installation and finishing that may be required due to repair or replacement of defective doors[ **and frames**].
3. Warranty Period for Solid-Core Exterior Doors: [Two][Five]<Insert number> years from date of Substantial Completion.
4. Warranty Period for Solid-Core Interior Doors: Life of installation.
5. Warranty Period for Hollow-Core Interior Doors: [One][Two]<Insert number> year(s) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Obtain flush wood doors [indicated to be blueprint matched with paneling][and wood paneling] from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for

fire-protection ratings [**and temperature-rise limits**]indicated on Drawings, based on testing at positive pressure in accordance with [UL 10C][or][NFPA 252].

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
  2. Temperature-Rise Limit: [**Where indicated on Drawings**][**At vertical exit enclosures and exit passageways**], provide doors that have a maximum transmitted temperature end point of not more than **450 deg F** above ambient after 30 minutes of standard fire-test exposure.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

### 2.3 FLUSH WOOD DOORS AND FRAMES, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with [AWI/AWMAC/WI's "**Architectural Woodwork Standards.**"] [ANSI/WDMA I.S. 1A.]

1. Provide [labels][and][certificates] from [AWI][WI] certification program indicating that doors [and frames] comply with requirements of grades specified.
  - a. This project has been registered with AWI as AWI Quality Certification Program Number <**Insert number**>.
  - b. Contractor registers the Work under this Section with the AWI Quality Certification Program at [www.awiqcp.org](http://www.awiqcp.org) or by calling 855-345-0991.
2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.
3. Hardwood Plywood: 0.05 ppm.
4. Particleboard: 0.09 ppm.
5. MDF More Than **5/16 Inch** Thick: 0.11 ppm.
6. MDF **5/16 Inch** or Less in Thickness: 0.13 ppm.

### 2.4 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS AND TRANSOM PANELS FOR TRANSPARENT FINISH

- A. Interior Doors, Solid-Core Five-Ply Veneer-Faced:

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. Masonite Architectural
  - b. Oregon Door
  - c. VT Industries, Inc.

2. Basis-of-Design Product: Subject to compliance with requirements, provide <Insert **manufacturer's name; product name or designation**> or comparable product by one of the following:
  - a. Masonite Architectural
  - b. Oregon Door
  - c. VT Industries, Inc.
3. Performance Grade: ANSI/WDMA I.S. 1A Standard Duty.
4. Performance Grade by Location:
  - a. ANSI/WDMA I.S. 1A Extra Heavy Duty: public toilets.
  - b. ANSI/WDMA I.S. 1A Standard Duty: [**Closets (not including janitor's closets)**][and][**private toilets**]<Insert locations>[and where indicated on Drawings].
5. ANSI/WDMA I.S. 1A Quality Grade: Premium.
6. Architectural Woodwork Standards Quality Grade: Premium.
7. Faces: Single-ply wood veneer not less than **1/50 inch** thick.
  - a. Species: Select white maple.
  - b. Cut: Plain sliced (flat sliced).
  - c. Match between Veneer Leaves: Book match.
  - d. Assembly of Veneer Leaves on Door Faces: Center-balance match.
  - e. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
  - f. Room Match:
    - 1) Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by **20 feet** or more.
    - 2) Provide door faces of compatible color and grain within each separate room or area of building.
  - g. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Section 064216 "Flush Wood Paneling."
8. Exposed Vertical and Top Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
  - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
9. Core for Non-Fire-Rated Doors:
  - a. ANSI A208.1, Grade LD-1 particleboard.
    - 1) Provide doors with glued-wood-stave cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087100 "Door

Hardware."

- b. Glued wood stave.
  - c. WDMA I.S. 10 structural composite lumber.
    - 1) Screw Withdrawal, Door Face: **550 lbf.**
    - 2) Screw Withdrawal, Vertical Door Edge: **550 lbf.**
  - d. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
10. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
- a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
11. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

## 2.5 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
  - 1. Wood Species: [**Same species as door faces**][**Species compatible with door faces**][**Any closed-grain hardwood**].
  - 2. Profile: [**Flush rectangular beads**][**Recessed tapered beads**][**Recessed tapered beads with exposed banding**][**Lipped tapered beads**][**Manufacturer's standard shape**].
  - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of **0.048-inch**-thick, cold-rolled steel sheet; [**factory primed for paint**][**with baked-enamel- or powder-coated**] finish; and approved for use in doors of fire-protection rating indicated on Drawings.
- D. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.
  - 1. Wood Species: [**Same species as door faces**][**Species compatible with door faces**][**Any closed-grain hardwood**].
  - 2. Profile: [**Flat**][**Chevron**].
- E. Metal Louvers:



1. Manufacturers: Subject to compliance with requirements, **[provide products by the following][provide products by one of the following][available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
  - a. [Allegion plc]
  - b. [Anemostat Air Distribution; Anemostat, Inc.; Mestek, Inc.]
  - c. [ASSA ABLOY]
  - d. [JL Industries; Activar Construction Products Group, Inc.]
  - e. [L & L Louvers, Inc.]
  - f. [McGill Architectural Products]
  - g. <Insert manufacturer's name>
2. Blade Type: Vision-proof, inverted Y.
3. Metal and Finish:
  - a. Extruded aluminum with Class II, clear anodic finish, AA-M12C22A31.

## 2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
  1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
  1. Locate hardware to comply with DHI-WDHS-3.
  2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
  3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
  4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
  5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Transom and Side Panels:
  1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
  2. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
  3. Fabricate door and transom panels with full-width, solid-lumber[, **rabbeted,**] meeting rails.
  4. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
  3. Louvers: Factory install louvers in prepared openings.
- E. Exterior Doors: Factory treat exterior doors with water repellent after fabrication has been completed but before factory **[priming][finishing]**.
1. Flash top of outswinging doors with manufacturer's standard metal flashing.

## 2.7 FACTORY PRIMING

- A. Doors for Opaque Finish: Factory prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in **[Section 099113 "Exterior Painting."][Section 099123" Interior Painting.]**

## 2.8 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  2. Finish faces, all four edges, edges of cutouts, and mortises.
  3. Stains and fillers may be omitted on **[ top and ]** bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Factory finish doors that are indicated on Drawings to receive transparent finish.
- D. Factory finish doors where indicated in schedules or on Drawings as factory finished.
- E. Transparent Finish:
1. Architectural Woodwork Standards Grade: **[Premium][Custom]**.
    - a. System-5, Varnish, Conversion.
    - b. System-9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
    - c. System-10, UV Curable, Water Based.
    - d. System-11, Polyurethane, Catalyzed.
  2. ANSI/WDMA I.S. 1A Grade: **[Premium][Custom]**.
    - a. TR-4 Conversion Varnish.
    - b. TR-6 Catalyzed Polyurethane.
    - c. TR-8 UV Cured Acrylated Polyester/Urethane.
  3. Staining: **[Match Architect's sample][As selected by Architect from manufacturer's full range][None required]**.

4. Sheen: [**Satin**][**Semigloss**].

F. Opaque Finish:

1. Architectural Woodwork Standards Grade: [**Premium**][**Custom**].
  - a. System-5, Varnish, Conversion.
  - b. System-9, UV Curable, Acrylated Epoxy, Polyester, or Urethane.
  - c. System-10, UV Curable, Water Based.
  - d. System-11, Polyurethane, Catalyzed.
2. ANSI/WDMA I.S. 1A Grade: [**Premium**][**Custom**].
  - a. OP-4 Conversion Varnish.
  - b. OP-6 Catalyzed Polyurethane.
3. Color: [**Match Architect's sample**][**As selected by Architect from manufacturer's full range**].
4. Sheen: [**Satin**][**Semigloss**][**Gloss**].

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Hardware: For installation, see [**Section 087100 "Door Hardware."**][**Section 087111 "Door Hardware (Descriptive Specification)."**]
- B. Install doors[ **and frames**] to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
  1. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches**.
  2. Anchor frames to anchors or blocking built in or directly attached to substrates.
    - a. Secure with countersunk, concealed fasteners and blind nailing.
    - b. Use fine finishing nails[ **or finishing screws**] for exposed fastening, countersunk

and filled flush with woodwork.

- 1) For factory-finished items, use filler matching finish of items being installed.
  3. Install fire-rated doors and frames in accordance with NFPA 80.
  4. Install smoke- and draft-control doors in accordance with NFPA 105.
- D. Job-Fitted Doors:
1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
    - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
  2. Machine doors for hardware.
  3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  4. Clearances:
    - a. Provide **1/8 inch** at heads, jambs, and between pairs of doors.
    - b. Provide **1/8 inch** from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
    - c. Where threshold is shown or scheduled, provide **1/4 inch** from bottom of door to top of threshold unless otherwise indicated.
    - d. Comply with NFPA 80 for fire-rated doors.
  5. Bevel non-fire-rated doors **1/8 inch in 2 inches** at lock and hinge edges.
  6. Bevel fire-rated doors **1/8 inch in 2 inches** at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

### 3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: **[Owner will engage][Engage]** a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
1. Provide inspection of installed Work through **[AWI's Quality Certification Program][WT's Certified Compliance Program]**, certifying that wood doors and frames, including installation, comply with requirements of AWI/AWMCA/WT's "Architectural Woodwork Standards" for the specified grade.
  2. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
  3. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically

controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in [NFPA 80][and][NFPA 101].

### 3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

## SECTION 083113 - ACCESS DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Flush access doors with exposed flanges.

#### 1.2 ALLOWANCES

#### 1.3 ACTION SUBMITTALS

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

1. Include construction details[, **fire ratings**,] material descriptions, dimensions of individual components and profiles, and finishes.

##### B. Product Schedule: For access doors and frames. [ **Use same designations indicated on Drawings.** ]

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

#### 2.2 ACCESS DOORS AND FRAMES

##### A. Flush Access Doors with Exposed Flanges:

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. Cendrex Inc.
  - b. JL Industries; Activar Construction Products Group, Inc.
  - c. Larsen's Manufacturing Company
  - d. MIFAB, Inc
  - e. Milcor by Duravent; Duravent Group.
2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Optional Features: Piano hinges.
4. Locations: Wall and ceiling.
5. Door Size: As required to provide access to valves, controls, etc..
6. Uncoated Steel Sheet for Door: Nominal **0.060 inch**, 16 gage, factory primed.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Cam latch, screwdriver operated.

## 2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Frame Anchors: Same material as door face.

## 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 mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- D. Latch and Lock Hardware:
  - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
  - 2. Keys: Furnish two keys per lock and key all locks alike.

## 2.5 FINISHES

- A. Comply with NAAMM/NOMMA AMP 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
  - 2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of **1 mil** for topcoat.
    - a. Color: As selected by Architect from full range of industry colors.

### 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 OF ACCESS DOORS AND FRAMES

- A. Comply with manufacturer's written instructions for installing access doors and frames.

#### 3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113



## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Hinges.
2. Self-closing hinges and pivots.
3. Center-hung and offset pivots.
4. Continuous, pin-and-barrel-type hinges.
5. Continuous, gear-type hinges.
6. Concealed hinges.
7. Bored locks.
8. Mortise locks.
9. Interconnected locks.
10. Roller latches.
11. Push-pull latches.
12. Bored auxiliary locks.
13. Mortise auxiliary locks.
14. Narrow-stile auxiliary locks.
15. Push-button combination locks.
16. Electric strikes.
17. Electromagnetic locks.
18. Delayed-egress electromagnetic locks.
19. Electromechanical locks.
20. Self-contained electronic locks.
21. Exit locks and alarms.
22. Surface bolts.
23. Manual flush bolts.
24. Automatic flush bolts.
25. Self-latching flush bolts.
26. Exit devices and auxiliary items.
27. Lock cylinders.
28. Key control cabinet.
29. Key lock boxes.
30. Key control system software.
31. Operating trim.
32. Surface closers.
33. Concealed closers.
34. Closer holder release devices.
35. Wall- and floor-mounted stops.
36. Electromagnetic door holders.
37. Overhead stops and holders.
38. Door gasketing.
39. Thresholds.

40. Sliding door hardware.
41. Folding door hardware.
42. Metal protective trim units.
43. Plastic protection plates.
44. Auxiliary door hardware.
45. Auxiliary electrified door hardware.

B. Related Requirements:

1. Section 064113 "Wood-Veneer-Faced Architectural Cabinets" for cabinet door hardware provided with cabinets.
2. Section 081113 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
3. Section 081216 "Aluminum Frames" for door silencers provided as part of aluminum frames.
4. Section 083113 "Access Doors and Frames" for access door hardware, including cylinders.

## 1.2 COORDINATION

- A. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction.
1. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field-verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each exposed product in each finish specified, in manufacturer's standard size.
- C. Samples for Verification: For each type of exposed product, in each finish specified.

1. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- D. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of product data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
  2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
  3. Content: Include the following information:
    - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
    - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    - d. Fastenings and other installation information.
    - e. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
    - f. Mounting locations for door hardware.
    - g. List of related door devices specified in other Sections for each door and frame.
- E. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

#### 1.4 INFORMATIONAL SUBMITTALS

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware schedule.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lockup for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

## 1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures, including excessive deflection, cracking, or breakage.
    - b. Faulty operation of doors and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  - 2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
    - a. Exit Devices: Two years from date of Substantial Completion.
    - b. Manual Closers: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Obtain each type of door hardware from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
- B. Means of Egress Doors: Latches do not require more than **15 lbf** to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1.
  - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than **5 lbf**.
  - 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 90 degrees, the door

will take at least 5 seconds to move to a position of 12 degrees from the latch.

5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

## 2.3 HINGES

### A. Hinges: ANSI/BHMA A156.1.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Baldwin; part of the Spectrum Brands Hardware and Home Improvement Group (HHI)
  - b. Don-Jo Mfg., Inc
  - c. Hager Companies
  - d. STANLEY; dormakaba USA, Inc.

## 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, and as follows:

1. Bored Locks: Minimum **1/2-inch** latchbolt throw.
2. Mortise Locks: Minimum **3/4-inch** latchbolt throw.
3. Deadbolts: Minimum [**1-inch**][**1.25-inch**]<Insert dimension> bolt throw.

### C. Lock Backset: **2-3/4 inches** unless otherwise indicated.

### D. Lock Trim:

1. Description: [**As indicated on Drawings**]<Insert description or manufacturer's design designation>.
2. Levers: [**Wrought**][**Forged**][**Cast**].
  - a. <Insert model number and description>.
3. Escutcheons (Roses): [**Wrought**][**Forged**][**Cast**].
4. Dummy Trim: Match lever lock trim and escutcheons.

### E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Bored Locks: ANSI/BHMA A156.2, Grade 1, Series 4000.

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. Arrow USA; an ASSA ABLOY Group company
  - b. BEST Access Solutions, Inc.; dormakaba USA Inc.
  - c. Corbin Russwin, Inc.; an ASSA ABLOY Group company
  - d. Hager Companies
  - e. SARGENT Manufacturing Company; ASSA ABLOY

## 2.5 AUXILIARY LOCKS

A. Bored Auxiliary Locks: ANSI/BHMA A156.36, Grade 1; with strike that suits frame.

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. Arrow USA; an ASSA ABLOY Group company
  - b. BEST Access Solutions, Inc.; dormakaba USA Inc.
  - c. SARGENT Manufacturing Company; ASSA ABLOY
  - d. STANLEY; dormakaba USA, Inc.

## 2.6 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

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. Arrow USA; an ASSA ABLOY Group company
  - b. BEST Access Solutions, Inc.; dormakaba USA Inc.
  - c. Hager Companies
  - d. SARGENT Manufacturing Company; ASSA ABLOY
  - e. STANLEY; dormakaba USA, Inc.

B. Standard Lock Cylinders: ANSI/BHMA A156.5, [**Grade 1**][**Grade 1A**][**Grade 2**] permanent cores; face finished to match lockset.

1. Core Type: [**Interchangeable**][**Removable**].

- C. High-Security Lock Cylinders: ANSI/BHMA A156.30, [Grade 1][Grade 2][Grade 3] permanent cores that are removable; face finished to match lockset.
  - 1. [Type M, mechanical][Type E, electrical].
- D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

## 2.7 KEYING

- A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
  - 1. Master Key System: Change keys and a master key operate cylinders.
    - a. Provide three cylinder change keys and five master keys.
    - b. Match to Master key for existing locksets in facility.
  - 2. Existing System:
    - a. Master key or grand master key locks to Owner's existing system.
  - 3. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.

## 2.8 SURFACE CLOSERS

- A. Surface Closers: ANSI/BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
  - 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. Arrow USA; an ASSA ABLOY Group company
    - b. Corbin Russwin, Inc.; an ASSA ABLOY Group company
    - c. Hager Companies
    - d. SARGENT Manufacturing Company; ASSA ABLOY
    - e. STANLEY; dormakaba USA, Inc.

## 2.9 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: ANSI/BHMA A156.16.
  - 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. ASI-American Specialties, Inc.
    - b. Baldwin; part of the Spectrum Brands Hardware and Home Improvement Group (HHI)
    - c. Hager Companies
    - d. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY

## 2.10 AUXILIARY DOOR HARDWARE

- A. Auxiliary Door Hardware: ANSI/BHMA A156.16.
  - 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. Baldwin; part of the Spectrum Brands Hardware and Home Improvement Group (HHI)
    - b. Hager Companies
    - c. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY

## 2.11 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
  - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and ANSI/BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended; however, aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
  - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed,



except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

## 2.12 FINISHES

- A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

### 3.3 INSTALLATION OF DOOR HARDWARE

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
  1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  2. Custom Steel Doors and Frames: HMMA 831.

3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
  - B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
    1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
    2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
  - C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
  - D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
    1. Replace construction cores with permanent cores as directed by Owner.
  - E. Key Control System:
    1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
  - F. Stops: Provide floor 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.

### 3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
  2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.

### 3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.

- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

END OF SECTION 087100

## SECTION 088300 - MIRRORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Silvered flat glass mirrors.

B. Related Requirements:

1. Section 102800 "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of mirror and mirror mastic.

#### 1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

#### 1.5 QUALITY ASSURANCE

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

## 1.8 WARRANTY

- A. Special Warranty: 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 SOURCE LIMITATIONS

- A. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- B. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

### 2.2 SILVERED FLAT GLASS MIRRORS

- 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. Guardian Glass LLC
  - 2. National Glass Industries, Inc.
  - 3. Trulite Glass & Aluminum Solutions, LLC.
  - 4. Walker Glass Co., Ltd
- B. Mirrors, General: ASTM C1503[; **manufactured using copper-free, low-lead mirror coating process**].
- C. Annealed Monolithic Glass Mirrors: Mirror [Select][Glazing] Quality [Q1 clear][Q2 low-iron float glass with a minimum 91 percent visible light transmission][Q2 tinted].
  - 1. Nominal Thickness: [3.0 mm][4.0 mm][5.0 mm][6.0 mm][As indicated]<Insert thickness>.
  - 2. Tint Color: [Blue][Black][Bronze][Gold][Gray][Green]<Insert color>.
- D. Tempered Glass Mirrors: Mirror Glazing Quality Q3 for blemish requirements and complying with ASTM C1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; [clear][tinted].

1. Nominal Thickness: [3.0 mm][4.0 mm][5.0 mm][6.0 mm][As indicated]<Insert thickness>.
2. Tint Color: [Blue][Black][Bronze][Gold][Gray][Green]<Insert color>.

E. Laminated Mirrors: ASTM C1172, Type II.

1. Glass for Outer Lite: Annealed float glass, Mirror [Select][Glazing] Quality, [clear][low-iron float glass with a minimum 91 percent visible light transmission][tinted].
  - a. Tint Color: [Blue][Black][Bronze][Gold][Gray][Green]<Insert color>.
2. Nominal Thickness for Outer Lite: [3.0 mm][4.0 mm][5.0 mm][6.0 mm][As indicated]<Insert thickness>.
3. Glass for Inner Lite: [Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality Q1; Class 1 (clear)][Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality Q2; Class 1 (low-iron)][Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality Q2; Class 1 (tinted)][Heat-strengthened float glass; ASTM C1048, Type I; Quality Q3; Class I (clear) Kind HS, Condition A][Tempered float glass; ASTM C1048, Type I; Quality Q3; Class I (clear), Kind FT, Condition A].
4. Nominal Thickness: [3.0 mm][4.0 mm][5.0 mm][6.0 mm][As indicated]<Insert thickness>.
5. Interlayer: Mirror manufacturer's standard **0.030-inch**-thick, clear polyvinyl-butylal interlayer with a proven record of showing no tendency to delaminate from, or cause damage to, silver coating.

F. Safety Glazing Products: For [film-backed][laminated][tempered] mirrors, provide products that comply with 16 CFR 1201, Category II.

### 2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
  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. C.R. Laurence Co., Inc.; CRH Americas, Inc.
    - b. Liquid Nails; PPG Industries, Inc.
    - c. Pecora Corporation
    - d. Royal Adhesives & Sealants: H.B. Fuller Company
  2. Adhesives shall have a VOC content of [70]<Insert value> g/L or less.

3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
  5. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." The building concentration of formaldehyde shall not exceed half of the indoor recommended exposure limit or 33 mcg/cu. m and that of acetaldehyde shall not exceed 9 mcg/cu. m.
- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

#### 2.4 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
1. Finish: [**Clear**][**Gold**] bright anodized.
- B. Aluminum J-Channels and Cleat: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
1. Aluminum J-Channel and Cleat, Bottom and Side Trim: J-channels formed with front leg and back leg not less than **5/16 and 3/4 inch** in height, respectively.
    - 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) C.R. Laurence Co., Inc.; CRH Americas, Inc.
  2. Finish: [**Clear**][**Gold**] bright anodized.
- C. Mirror Bottom Clips: [**As indicated**]**<Insert description and finish or product designation and manufacturer's name>**.
- D. Mirror Top Clips: [**As indicated**]**<Insert description and finish or product designation and manufacturer's name>**.
- E. Plated Steel Hardware: Formed-steel shapes with plated finish indicated.

1. Profile: As indicated.
  2. Finish: <Insert manufacturer's finish designation and name>.
- F. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- G. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

## 2.5 FABRICATION

- A. Shop fabricate mirrors to greatest extent possible.
- B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished.
1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
- D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

### 3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.



### 3.3 INSTALLATION OF MIRRORS

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
  - 1. NGA Publications: "Laminated Glazing Reference Manual," "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."
- B. Install mirrors with mastic and 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.
  - 1. Aluminum J-Channels: Provide setting blocks **1/8 inch** thick by **4 inches** long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than **1/4 inch** wide by **3/8 inch** long at bottom channel.
  - 2. Aluminum J-Channels and Cleat: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.
  - 3. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.
  - 4. Install mastic as follows:
    - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
    - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
    - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of **1/8 inch** between back of mirrors and mounting surface.

### 3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 088300

## SECTION 092900 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Trim accessories.
3. Texture finishes.

B. Related Requirements:

1. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection:

#### 1.3 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.

#### 1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or manufacturer's written instructions, whichever are more stringent.

- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

- C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings in accordance with ASTM E119; tested by a qualified testing agency.

### 2.3 GYPSUM BOARD, GENERAL

- A. Size: Provide panel products in maximum lengths and widths available that will minimize joints in each area and that correspond with support system specified or indicated on Drawings.

### 2.4 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.

- 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. Gold Bond Building Products, LLC provided by National Gypsum Company
  - b. USG Corporation
- 2. Thickness: As indicated on Drawings.
- 3. Long Edges: Tapered.

- B. Gypsum Board, Type X: ASTM C1396/C1396M.

- 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 Gypsum]
  - b. [CertainTeed; SAINT-GOBAIN]
  - c. [Georgia-Pacific Gypsum LLC]
  - d. [Gold Bond Building Products, LLC provided by National Gypsum Company]
  - e. [PABCO Gypsum]
  - f. [Panel Rey]
  - g. [USG Corporation]
  - h. <Insert manufacturer's name>

2. Thickness: As indicated on Drawings.
3. Long Edges: Tapered.

## 2.5 TRIM ACCESSORIES

### A. Interior Trim: ASTM C1047.

1. Material: Galvanized-steel sheet 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. Expansion (control) joint.
  - g. Curved-Edge Cornerbead: With notched or flexible flanges.

## 2.6 JOINT TREATMENT MATERIALS

### A. General: Comply with ASTM C475/C475M requirements.

1. Mold-Resistant Joint Compound: Use mold-resistant formulations with mold-resistant panel products.

### B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended in writing 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 drying-type, all-purpose 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 Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended in writing by backing panel manufacturer.
2. Cementitious Backer Units: As recommended in writing by backer unit manufacturer.

3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

## 2.7 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise specified or indicated on Drawings.
- C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers as follows:
  1. Non-Fire-Resistance-Rated Assemblies: slag or rock wool.
  2. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- D. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840 requirements.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft.** in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch-** wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to 1/2-inch-** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- I. Install sound-attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Gypsum Wallboard: As indicated on Drawings.
  - 2. Gypsum Board, Type X: As indicated on Drawings.
  - 3. Gypsum Ceiling Board: As indicated on Drawings.
  - 4. Mold-Resistant Gypsum Board: Utilize at all moist locations where ceramic tile is not called for..
- 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 on Drawings.
  - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise specified or indicated on Drawings 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 stairwells and other high walls, install panels horizontally unless otherwise indicated on Drawings or required by fire-resistance-rated assembly.
  - 3. On Z-shaped 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.
  - C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.
  - D. Curved Surfaces:
    1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus **12-inch-** long straight sections at ends of curves and tangent to them.
    2. For double-layer construction, fasten base layer to studs with screws **16 inches** o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced **12 inches** o.c.
- 3.4 APPLICATION OF JOINT TREATMENT MATERIALS
- A. Finishing Panel Products: Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare panel 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 panel joints, except for trim products specifically indicated as not intended to receive tape.
  - D. Interior Gypsum Board: Finish panels to levels indicated below and in accordance with ASTM C840:
    1. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
      - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- 3.5 PROTECTION
- A. Protect adjacent surfaces from joint compound and promptly remove from floors and other non-gypsum board surfaces. Repair surfaces stained, marred, or otherwise damaged during gypsum board installation and finishing.
  - B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
  - C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
    1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    2. Indications that panels are mold damaged include, but are not limited to, fuzzy or

splotchy surface contamination and discoloration.

END OF SECTION 092900



## SECTION 093013 - CERAMIC TILING

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Quarry tile.
2. Pressed floor tile.
3. Porcelain tile.
4. Ceramic mosaic tile.
5. Glazed wall tile.
6. Thresholds.
7. Tile backing panels.
8. Waterproof membranes.
9. Crack isolation membranes.
10. Setting material.
11. Grout materials.

##### B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of movement joints in tile surfaces.

#### 1.2 DEFINITIONS

- A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. Face Size: Actual tile size, excluding spacer lugs.
- C. Large Format Tile: Tile with at least one edge **15 inches** or longer.
- D. Module Size: Actual tile size plus joint width indicated.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For tile, grout, and accessories involving color selection or shade variation.
- C. Samples for Verification:
  1. Full-size units of each type and composition of tile and for each color and finish required.
  2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and

composition of tile and for each color and finish required. Make samples at least **12 inches** square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.

3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds in **6-inch** lengths.
5. Metal flooring transitions **6-inch** lengths.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
  2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

#### 1.7 WARRANTY

- A. System Warranty: Manufacturer's non-prorated comprehensive warranty that agrees to repair and replace defective installation areas, material, and labor that fail under normal usage within specified warranty period.
  1. Warranty Period: 10 years from date of Product Purchase.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Tile: Obtain **[tile of each type and color or finish][tile of each type][tile of each color or finish][tile]** from single source or producer.
1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Tiling System: Obtain system products from single manufacturer and each aggregate from single source or producer.
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. ARDEX Americas
    - b. Laticrete International, Inc.
    - c. MAPEI Corporation
  2. Basis-of-Design Product: Subject to compliance with requirements, provide **<Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
    - a. ARDEX Americas
    - b. Laticrete International, Inc.
    - c. MAPEI Corporation
  3. Obtain setting and grouting materials, except for unmodified portland cement and aggregate, from single manufacturer.
  4. Obtain underlayment from manufacturer of setting and grouting materials.
  5. Obtain waterproof membrane, crack isolation, and other required membranes from manufacturer of setting and grouting materials.
  6. Obtain joint sealants from manufacturer of setting and grouting materials.
- C. Accessory Products: Obtain each of the following products specified in this Section from a single manufacturer:
1. Stone thresholds.
  2. Backer units.

### 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
1. Provide tile complying with Standard Grade requirements unless otherwise indicated.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
  - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

### 2.3 PORCELAIN TILE

- A. Porcelain Tile Type: Unglazed.
  - 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. Daltile; a brand of Dal-Tile Corporation
    - b. Marazzi USA; a brand of Dal-Tile Corporation
  - 2. Basis-of-Design Product: Subject to compliance with requirements, provide **<Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
    - a. Daltile; a brand of Dal-Tile Corporation
    - b. Marazzi USA; a brand of Dal-Tile Corporation
  - 3. Certification: Tile certified by the Porcelain Tile Certification Agency.
  - 4. Face Size: 12" by 24".
  - 5. Refer to drawings for additional sizing
  - 6. Face Size Variation: Rectified.
  - 7. Thickness: **3/8 inch**.
  - 8. Product Use Classification: Interior, Wet (IW).
  - 9. Physical Properties: Chemical resistant when tested with indicated chemicals in accordance with ASTM C650.
  - 10. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.
  - 11. Grout Color: As selected by Architect from manufacturer's full range.
  - 12. Precoat with temporary protective coating.
  - 13. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable

and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

- a. Base Cap: Surface bullnose, module size same as adjoining flat tile.
- b. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.
- c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it; same size as adjoining flat tile.
- d. External Corners: Surface bullnose, module size same as adjoining flat tile.
- e. Internal Corners: Field-buttet square corners.

## 2.4 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Gypsum Panel: ASTM C1658/C1658M, with fiberglass mat partially or completely embedded into the core.
  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; SAINT-GOBAIN
    - b. USG Corporation
  2. Basis-of-Design Product: Subject to compliance with requirements, provide **<Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
    - a. CertainTeed; SAINT-GOBAIN
    - b. USG Corporation
  3. Core: **5/8 inch**, Type X.
  4. Long Edges: Tapered.
  5. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

## 2.5 CRACK ISOLATION MEMBRANES

- A. General: Manufacturer's standard product[, **selected from the following,**] that complies with ANSI A118.12 for standard performance and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

## 2.6 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
  1. Cleavage Membrane: Installer's option of material that complies with ANSI A108.02, paragraph 3.8.
  2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, **2 by 2 inches** by **0.062-inch** diameter; comply with ASTM A1064/A1064M except for minimum wire size.
  3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C847.

- a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
  - b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
  - c. Configuration over Studs and Furring: Flat.
  - d. Configuration over Solid Surfaces: Self-furring.
  - e. Weight: [2.5 lb/sq. yd.][3.4 lb/sq. yd.].
4. Latex Additive: [Manufacturer's standard][acrylic resin][or][styrene-butadiene-rubber] 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 and aggregate mortar bed.
- B. Standard Dry-Set Mortar (Thinset): ANSI A118.1.
1. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.1.

## 2.7 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High-Performance Tile Grout: ANSI A118.7.
1. Polymer Type:
    - a. Dry, redispersible form, prepackaged with other dry ingredients.
    - b. Liquid-latex form for addition to prepackaged dry-grout mix.
- C. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

## 2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, 4.0 mils thick.
- C. Metal Edge Trim: Profile designed for wall terminations and edge protection.
1. Description: L-shaped.
  2. Terminations: Outside corners matching edge-protection profile.
  3. Material and Finish: Polished nickel anodized aluminum exposed-edge material.
- D. Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after

grouting is completed without damaging grout or tile.

- E. 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.
- F. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped **1/4 inch per foot** toward drains.

- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- E. Substrate Flatness:
  - 1. For tile shorter than **15 inches**, confirm that structure or substrate is limited to variation of **1/4 inch in 10 ft.** from the required plane, and no more than **1/16 inch in 12 inches** when measured from tile surface high points.
  - 2. For large format tile, tile with at least one edge **15 inches** or longer, confirm that structure or substrate is limited to **1/8 inch in 10 ft.** from the required plane, and no more than **1/16 inch in 24 inches** when measured from tile surface high points.

### 3.3 INSTALLATION OF CERAMIC TILE SYSTEM

- A. Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- B. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
  - 1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- C. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
  - 1. Allow crack isolation membrane to cure before installing tile or setting materials over it.
- D. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
  - 1. Add materials, water, and additives in accurate proportions.
  - 2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.
- E. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
  - 1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors in wet areas.
    - b. Tile floors consisting of tiles **8 by 8 inches** or larger.



2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
  3. 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.
  4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
  5. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
    - a. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
    - b. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
  6. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- F. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- G. Metal Flooring Transitions: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- H. Metal Wall Trim: Install at locations indicated on Drawings.
- I. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- 3.4 ADJUSTING AND CLEANING
- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
  2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and

only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.5 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

### 3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
  - 1. TCNA F111 <Insert designation>: Method ANSI A108.1A. Cement mortar bed (thickset) installed over cleavage membrane.
    - a. Ceramic Tile Type: Per drawings.
    - b. Bond Coat for Cured-Bed Method: Dry-set mortar.
    - c. Grout: High-performance sanded cement grout.
    - d. Joint Width: **1/8 inch**.
    - e. Movement Joints: Types located on Drawings.
- B. Interior Wall Installations, Masonry or Concrete:
- C. Interior Wall Installations, Wood or Metal Studs or Furring:
  - 1. TCNA W245 <Insert designation>: Thinset mortar on glass-mat, water-resistant gypsum backer board over waterproof membrane.
    - a. Ceramic Tile Type: Per drawings.
    - b. Thinset Mortar: Dry-set Improved modified dry-set mortar.
    - c. Grout: High-performance sanded cement grout.
    - d. Joint Width: **1/8 inch**.
    - e. Movement Joints: Types located on Drawings.

END OF SECTION 093013

## SECTION 095123 - ACOUSTICAL TILE CEILINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Acoustical tiles.
2. Metal suspension system.

B. Related Requirements:

1. Section 095113 "Acoustical Panel Ceilings" for ceilings consisting of mineral-base and glass-fiber-base acoustical panels and exposed suspension systems.
2. Section 095133 "Acoustical Metal Pan Ceilings" for ceilings consisting of metal-pan units with exposed and concealed suspension systems.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

#### 1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **[Project site]**<Insert location>.

#### 1.3 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Sustainable Design Submittals:

C. Samples: For each exposed product and for each color and texture specified, **6 inches** in size.

D. Samples for Initial Selection: For components with factory-applied finishes.

E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Tiles: Set of full-size Samples of each type, color, pattern, and texture.
2. Concealed Suspension-System Members: [**6-inch-**<Insert dimension> long Sample of each type.
3. Exposed Moldings and Trim: Set of [**6-inch-**<Insert dimension> long Samples of each type and color.
4. Seismic Clips: Full size.

- F. Delegated Design Submittals: For seismic restraints for ceiling systems.
  - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Ceiling suspension-system members.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
  - 5. Size and location of initial access modules for acoustical tile.
  - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    - a. Lighting fixtures.
    - b. Diffusers.
    - c. Grilles.
    - d. Speakers.
    - e. Sprinklers.
    - f. Access panels.
    - g. Perimeter moldings.
    - h. <Insert item>.
  - 7. Show operation of hinged and sliding components adjacent to acoustical tiles.
  - 8. Minimum Drawing Scale: [1/4 inch = 1 foot][1/8 inch = 1 foot][1:50][1:100]<Insert scale>.
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical tile ceiling, for tests performed by [manufacturer and witnessed by a qualified testing agency][a qualified testing agency].
- D. Evaluation Reports: For each acoustical tile ceiling suspension system[ and anchor and fastener type], from ICC-ES.
- E. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials[, **from the same production run,**] that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Units: Full-size tiles equal to [2]<Insert number> percent of quantity installed.
  - 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to [2]<Insert number> percent of quantity installed.

## 1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockup of typical ceiling area as indicated on Drawings.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Source Limitations for Suspended Acoustical Tile Ceiling System: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.
- B. Source Limitations for Directly Attached Acoustical Tile Ceiling Tile: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.
- B. Seismic Performance: Suspended ceilings to withstand the effects of earthquake motions determined in accordance with [ASCE/SEI 7]<Insert requirement>.
- C. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Class [A][B][C] in accordance with ASTM E1264.
  - 2. Smoke-Developed Index: [50][450]<Insert value> or less.
- D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

### 2.3 ACOUSTICAL TILES

- A. Acoustical Tiles:
  - 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. Armstrong World Industries, Inc
    - b. CertainTeed; SAINT-GOBAIN
  - 2. Basis-of-Design Product: Subject to compliance with requirements, provide <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
    - a. Armstrong World Industries, Inc
    - b. CertainTeed; SAINT-GOBAIN

3. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
4. Color: White.
5. Light Reflectance (LR): Not less than 0.65.
6. Ceiling Attenuation Class (CAC): Not less than 30.
7. Noise Reduction Coefficient (NRC): Not less than 0.60.
8. Edge/Joint Detail: Square, kerfed, and rabbeted; tongue and grooved; or butt.
9. Thickness: **5/8 inch**.
10. Modular Size: As indicated on Drawings.
11. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.

## 2.4 METAL SUSPENSION SYSTEM

### A. Concealed or Semi-Exposed Metal Suspension System:

1. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized, **G30** coating designation.
  - a. Structural Classification: Intermediate-duty system.
  - b. Access: Upward and [**end pivoted**][**or**][**side pivoted**], with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.
    - 1) Initial Access Opening: In each module, **24 by 24 inches**.

## 2.5 ACCESSORIES

### A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to [**five**]**<Insert safety factor>** times that imposed by ceiling construction, as determined by testing in accordance with ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
  - a. Type: [**Cast-in-place**][**Postinstalled expansion**][**Postinstalled bonded**] anchors.
  - b. Corrosion Protection, Carbon Steel: Components zinc plated in accordance with ASTM B633, Class SC 1 (mild) service condition.
  - c. Corrosion Protection, Stainless Steel: Components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to [10]<Insert safety factor> times that imposed by ceiling construction, as determined by testing in accordance with ASTM E1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Stainless Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than [0.106-inch-][0.135-inch-]<Insert dimension> diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

F. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

H. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical tiles in-place during a seismic event.

## 2.6 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

## 2.7 MISCELLANEOUS MATERIALS

- A. Acoustical Tile Adhesive: Type recommended in writing by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.
- B. Staples: 5/16-inch- long, divergent-point staples.



## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Testing Substrates: Before adhesively bonding tiles to wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- C. Layout openings for penetrations centered on the penetrating items.

### 3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings in accordance with ASTM C636/C636M[, **seismic design requirements,**] and manufacturer's written instructions.
  - 1. Fire-Rated Assembly: Install fire-rated ceiling systems in accordance with tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required[ **and, if permitted with fire-resistance-rated ceilings,**] to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye

- screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. Space hangers not more than **48 inches** o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than **8 inches** from ends of each member.
  11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than **16 inches** o.c. and not more than **3 inches** from ends. Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Arrange directionally patterned acoustical tiles as follows:
1. As indicated on reflected ceiling plans.
  2. Install tiles with pattern running in one direction parallel to **[long][short]** axis of space.
  3. Install tiles in a basket-weave pattern.
- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges of tiles so tile-to-tile joints are interlocked.
1. Fit adjoining tiles to form flush, tight joints. Scribe and cut tiles for accurate fit at borders and around penetrations through ceiling.
  2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tiles

and moldings, spaced **12 inches** o.c.

3. Protect lighting fixtures and air ducts in accordance with requirements indicated for fire-resistance-rated assembly.

### 3.4 INSTALLATION OF DIRECTLY ATTACHED ACOUSTICAL TILE CEILINGS

- A. Adhesive Installation: Install acoustical tile by bonding to substrate, using acoustical tile adhesive and procedure recommended in writing by tile manufacturer and as follows:
  1. Wipe and prime ceiling.
  2. Remove loose dust from backs of tiles by brushing.
  3. Install splines in joints between tiles and maintain bottom surface to a uniform level. Shim tile or correct substrate as required to maintain levelness.
  4. Maintain tight butt joints, aligned in both directions and coordinated with ceiling fixtures.
- B. Stapled Installation: Fasten acoustical tile to substrate using a minimum of two staples per tile that are installed in flanges of tile and as follows:
  1. Form double-lapped joint between tiles by securely pressing tile tongues into corresponding tile grooves.
  2. Maintain bottom surface of tiles to a uniform level. Shim tile or correct substrate as required to maintain levelness.
  3. Maintain tight butt joints, aligned in both directions and coordinated with ceiling fixtures.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units.
- D. Arrange directionally patterned acoustical tiles **[as indicated on Drawings][with pattern running in one direction parallel to long axis of space][with pattern running in one direction parallel to short axis of space][in a basket-weave pattern]<Insert requirement>**.

### 3.5 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of **[1/8 inch in 12 feet]<Insert dimensions>**, non-cumulative.
- B. Directly Attached Ceilings: Install bottom surface of tiles to a tolerance of **[1/8 inch in 12 feet and not exceeding 1/4 inch cumulatively]<Insert requirement>**.
- C. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of **[1/8 inch in 12 feet]<Insert dimensions>**, non-cumulative.

### 3.6 FIELD QUALITY CONTROL

- A. Special Inspections: **[Owner will engage][Engage]** a qualified special inspector to perform the following special inspections:
  1. Periodic inspection during the installation of suspended ceiling grids in accordance with

ASCE/SEI 7.

- B. Testing Agency: **[Owner will engage][Engage]** a qualified testing agency to perform tests and inspections.
- C. Perform the following tests and inspections of completed installations of acoustical tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.
  - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for **200 lbf** of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for **440 lbf** of tension.
  - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical tile ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.7 ADJUSTING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

## SECTION 096516 - RESILIENT SHEET FLOORING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Vinyl sheet flooring with backing.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color, texture, and pattern specified, in manufacturer's standard size, but not less than **6-by-9-inch** sections.
  - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than **9 inches** long, of each color required.
- C. Samples for Initial Selection: For each type of resilient sheet flooring indicated.
- D. Samples for Verification: For each type of resilient sheet flooring, in manufacturer's standard size, but not less than **6-by-9-inch** sections of each color, texture, and pattern required.
  - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than **9 inches** long, of each color required.
- E. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of **6-by-9-inch** Sample applied to a rigid backing and prepared by Installer for this Project.
- F. Product Schedule: For resilient sheet flooring. [ **Use same designations indicated on Drawings.** ]

#### 1.3 INFORMATIONAL SUBMITTALS

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Resilient Sheet Flooring: Furnish not less than **10 linear feet** for every **500 linear feet** or

fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring 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 rolls upright.

#### 1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **85 deg F**, in spaces to receive resilient sheet flooring during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **[95 deg F]**<Insert temperature>.
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

#### 2.2 VINYL SHEET FLOORING WITH BACKING

- 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. Armstrong Flooring, Inc.
  - 2. Forbo Flooring Systems
  - 3. Patcraft; a division of Shaw Industries, Inc
- B. Product Standard: ASTM F1303.
  - 1. Type (Binder Content): **[Type I, minimum binder content of 90 percent][Type II, minimum binder content of 34 percent]**.
  - 2. Wear-Layer Thickness: Grade 1.

3. Overall Thickness: [As standard with manufacturer]<Insert thickness>.
  4. Interlayer Material: [Foamed plastic][None].
  5. Backing Class: [Class A (fibrous)][Class B (nonfoamed plastic)][Class C (foamed plastic)].
- C. Wearing Surface: [Smooth][Embossed][Smooth with embedded abrasives][Embossed with embedded abrasives].
- D. Sheet Width: [As standard with manufacturer][5 feet][6 feet][6.6 feet][12 feet]<Insert width>.
- E. Seamless-Installation Method: [Heat welded][Chemically bonded]<Insert requirements>.
- F. Colors and Patterns: [As indicated by manufacturer's designations][Match Architect's samples]<Insert colors and patterns>.

### 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 sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
- C. Seamless-Installation Accessories:
1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
    - a. Colors: As selected by Architect from manufacturer's full range to contrast with flooring.
  2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
- D. Integral-Flash-Cove-Base Accessories:
1. Cove Strip: **1-inch** radius provided or approved by resilient sheet flooring manufacturer.
  2. Cap Strip: Tapered vinyl cap provided or approved by resilient sheet flooring manufacturer.
  3. Corners: Metal inside and outside corners and end stops provided or approved by resilient sheet flooring manufacturer.
- E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- B. Concrete Substrates: Prepare according to ASTM F710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
  - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient



sheet flooring.

### 3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
  - 1. Maintain uniformity of flooring direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least **6 inches** away from parallel joints in flooring substrates.
  - 3. Match edges of flooring for color shading at seams.
  - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.
- H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
  - 1. Heat-Welded Seams: Comply with ASTM F1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
  - 2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.
- J. Integral-Flash-Cove Base: Cove resilient sheet flooring to dimension indicated up vertical surfaces. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.
  - 1. Install metal corners at inside and outside corners.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

## SECTION 096723 - RESINOUS FLOORING

### PART 1 - GENERAL

#### 1.1 SUMMARY

1. Resinous flooring.

B. Related Sections:

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

B. Samples: For each resinous floor system required and for each color and texture specified, **6 inches** square in size, applied to a rigid backing by Installer for this Project.

C. Samples for Initial Selection: For each type of exposed finish required.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1. Installation Company shall be certified by the resinous flooring manufacturer.

B. Material Certificates: For each resinous flooring component.

#### 1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

#### 1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.
- C. Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing in accordance with ASTM D635.

### 2.2 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Stoneshield with non-slip top coating or comparable product by one of the following:
    - a. Stonhard, Inc.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.
- C. System Characteristics:
  - 1. Color and Pattern: As selected by Architect from manufacturer's full range.
  - 2. Wearing Surface: Textured for slip resistance.
  - 3. Overall System Thickness: **40 mils.**
- D. System Physical Properties: Provide resinous flooring system with the following minimum

physical property requirements when tested in accordance with test methods indicated:

1. Compressive Strength: 10,000 psi minimum in accordance with ASTM C579.
  2. Tensile Strength: 2,000 psi minimum in accordance with ASTM C307.
  3. Flexural Modulus of Elasticity:  $2.0 \times 10^6$  psi minimum in accordance with ASTM C580.
  4. Water Absorption: .1 percent maximum in accordance with ASTM C413.
  5. Shrinkage:  $1.3 \times 10^{-5}$  in/in degrees percent maximum in accordance with ASTM C531.
  6. Impact Resistance: No chipping, cracking, or delamination and not more than **1/16-inch** permanent indentation in accordance with MIL-D-3134J.
  7. Resistance to Elevated Temperature: No slip or flow of more than **1/16 inch** in accordance with MIL-D-3134J.
  8. Abrasion Resistance: 0.06 gm maximum weight loss in accordance with ASTM D4060.
  9. Hardness: 85 to 90, Shore D in accordance with ASTM D2240.
  10. Critical Radiant Flux: [**0.45 W/sq. cm**][**0.22 W/sq. cm**] or greater in accordance with NFPA 253.
- E. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested in accordance with [ASTM D1308 for 50 percent immersion][ASTM D543, Procedure A, for immersion][ASTM C267 for immersion]<Insert testing requirements> in the following reagents for no fewer than seven days:
1. <Insert list of reagents that Owner has determined are likely to contact resinous flooring during in-service use>.
- F. Primer: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.
1. Products:
    - a. Stonhard Standard Primer or equal.
  2. Formulation Description: Utilize primer appropriate for final resinous flooring product.
- G. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended in writing by manufacturer for installation indicated.

## 2.3 INTEGRAL COVE BASE ACCESSORIES

- A. Installation Adhesive: As recommended in writing by accessory manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  1. Roughen concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with requirements in SSPC-SP 13/NACE No. 6, with a Concrete Surface Profile of 3 or greater in accordance with ICRI Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.
  2. Repair damaged and deteriorated concrete in accordance with resinous flooring manufacturer's written instructions.
  3. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft.**, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **5 lb of water/1000 sq. ft.** in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  4. Alkalinity and Adhesion Testing: Perform tests recommended in writing by resinous flooring manufacturer. Proceed with installation only after substrate alkalinity is not less than 6 or more than 8 pH unless otherwise recommended in writing by flooring manufacturer,
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.
  1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials in accordance with resinous

flooring manufacturer's written instructions.

### 3.3 INSTALLATION

- A. Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.
  - 1. Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  - 2. Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.
  - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.
- C. Integral Cove Base Accessories: Adhesively install precast accessories before applying flooring coats and in accordance with manufacturer's written instructions.
- D. Field-Formed Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
  - 1. Integral Cove Base: 6 inches high.
- E. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness specified for flooring system.
  - 1. Aggregates: Broadcast aggregates at rate recommended in writing by manufacturer. After resin is cured, remove excess aggregates to provide surface texture indicated.
- F. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness specified for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended in writing by manufacturer.
- G. Grout Coat: Apply grout coat to fill voids in surface of final body coat.
- H. Topcoats: Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

### 3.4 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring installation, require material samples for testing for compliance with requirements.
  - 1. Owner will engage an independent testing agency to take samples of materials being

used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reinstall flooring materials to comply with requirements.

### 3.5 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723



## SECTION 099123 - INTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Primers.
  2. Water-based finish coatings.
  3. Solvent-based finish coatings.
  4. Floor sealers and paints.
  5. Dry fall coatings.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
1. Include preparation requirements and application instructions.
  2. Indicate VOC content.
- B. Samples: For each type of topcoat product.
- C. Samples for Initial Selection: For each type of topcoat product.
- D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
1. Submit Samples on rigid backing, **8 inches** square.
  2. Apply coats on Samples in steps to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- E. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

#### 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 Products: 5 percent, but not less than **1 gal.** of each material and color applied.

#### 1.4 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.

#### 1.5 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 95 deg F**.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than **5 deg F** above the dew point; or to damp or wet surfaces.

### PART 2 - PRODUCTS

#### 2.1 PRIMERS

- A. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.
  - 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. Pratt & Lambert; a subsidiary of The Sherwin-Williams Company
    - b. Sherwin-Williams Company (The)

#### 2.2 WATER-BASED FINISH COATS

- A. Interior, Latex, Eggshell: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
  - 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. Pratt & Lambert; a subsidiary of The Sherwin-Williams Company
    - b. Sherwin-Williams Company (The)
  - 2. Gloss and Sheen Level: **[Manufacturer's standard eggshell finish][Gloss of 10 to 25 units at 60 degrees and sheen of 10 to 35 units at 85 degrees when tested in accordance with ASTM D523]<Insert requirements>**.
- B. Interior, Latex, Semigloss: Pigmented, water-based paint for use on primed/sealed interior

plaster and gypsum board, and on primed wood and metals.

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. Pratt & Lambert; a subsidiary of The Sherwin-Williams Company
  - b. Sherwin-Williams Company (The)
2. Gloss Level: **[Manufacturer's standard semigloss finish][Gloss of 35 to 70 units at 60 degrees when tested in accordance with ASTM D523]<Insert requirements>**.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  1. Wood: 15 percent.
  2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- G. 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 applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  1. After completing painting operations, use workers skilled in the trades involved to

reinstall items that were removed. Remove surface-applied protection if any.

- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Aluminum Substrates: Remove loose surface oxidation.
- I. 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.
- J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
  - 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. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in equipment rooms:
    - a. Uninsulated metal piping.
    - b. Uninsulated plastic piping.
    - c. Pipe hangers and supports.
    - d. Metal conduit.
    - e. Plastic conduit.
    - f. Tanks that do not have factory-applied final finishes.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Exposed ductwork and conduit throughout facility..
  - 2. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.

### 3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
  - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
  - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
  - 3. Allow empty paint cans to dry before disposal.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of

other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 INTERIOR PAINTING SCHEDULE

#### A. Steel Substrates:

- 1. High-Performance Architectural Latex System <As shown in drawings>:
  - a. Prime Coat: Alkyd quick-dry primer for metal.
  - b. Intermediate Coat: Matching topcoat.
  - c. Topcoat: Topcoat: Interior, latex, high-performance architectural coating, semigloss.

#### B. Finish Carpentry: Wood trim.

- 1. Latex over Latex Primer System As shown in drawings - up to three colors:
  - a. Prime Coat: Interior latex primer for wood.
  - b. Intermediate Coat: Matching topcoat.
  - c. Topcoat: Interior, latex, eggshell.

#### C. Gypsum Board Substrates:

- 1. Latex over Latex Sealer System As shown in drawings - up to three colors:
  - a. Prime Coat: Interior latex primer sealer.
  - b. Intermediate Coat: Matching topcoat.
  - c. Topcoat: Interior, latex, eggshell.

END OF SECTION 099123

## SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Dimensional characters.
    - a. Cast dimensional characters.

#### 1.2 DEFINITIONS

- A. Illuminated: Illuminated by lighting source integrally constructed as part of the sign unit.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
  - 3. Show message list, typestyles, graphic elements, and layout for each sign at least 1/2" scale minimum.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Dimensional Characters: Full-size Sample of each type of dimensional character.
  - 2. Full-size Samples, if approved, will be returned to Contractor for use in the Project.
- E. Product Schedule: For dimensional letter signs. Use same designations indicated on Drawings or specified.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify locations of electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: [Five]<Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.
  - 1. Uniform and concentrated loads need not be assumed to act concurrently.

2.2 DIMENSIONAL CHARACTERS

- A. Molded-Plastic Characters: Injection molded or thermoformed characters having uniform faces and profiles, and as follows:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. ASI Sign Systems, Inc
    - b. Gemini Signage; Gemini, Inc.
    - c. Inpro
  - 2. Basis-of-Design Product: Subject to compliance with requirements, provide <Insert



**manufacturer's name; product name or designation**> or comparable product by one of the following:

- a. ASI Sign Systems, Inc
  - b. Gemini Signage; Gemini, Inc.
  - c. Inpro
3. Color: Manufacturer's standard integral color process, in color as selected by Architect from manufacturer's full range.
  4. Typeface: Arial Narrow, Helvetica Condensed, or equal..

## 2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
    - b. Fastener Heads: For nonstructural connections, use flathead screws and bolts with tamper-resistant Allen-head slots unless otherwise indicated.
  3. Sign Mounting Fasteners:
    - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

## 2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  4. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
  5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
  6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff

castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

- B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.
  - 1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match sign-background color unless otherwise indicated.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## 2.6 LACQUER COATING FOR COPPER-ALLOY FINISHES

- A. Lacquer Coating: Clear, organic, waterborne, air-drying, acrylic lacquer called "Incralac"; specially developed for coating copper-alloy products; consisting of a solution of acrylic resin, methyl methacrylate copolymer, leveling agent, and corrosion inhibitor benzotriazole.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF DIMENSIONAL CHARACTERS

- A. General: Install signs using mounting methods indicated and according to manufacturer's

written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
  - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
  - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
2. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position, so that signage is correctly located and aligned.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101419

## SECTION 102113.17 - PHENOLIC-CORE TOILET COMPARTMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Phenolic-core toilet compartments.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for blocking.
2. Section 102800 "Toilet, Bath, and Laundry Accessories" for accessories mounted on toilet compartments.

#### 1.2 ACTION SUBMITTALS

A. Product Data.

1. Phenolic-core toilet compartments.
  - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show ceiling grid, ceiling-mounted items, and overhead support or bracing locations.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment.

1. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: Actual sample of finished products for each type of toilet compartment, hardware, and accessory.

1. Size: Manufacturers' standard size.

#### 1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Materials: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Door Hinges: One hinge(s) with associated fasteners.
  - 2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
  - 3. Door Bumper: One door bumper(s) with associated fasteners.
  - 4. Door Pull: One door pull(s) with associated fasteners.
  - 5. Fasteners: 10 fasteners of each size and type.

#### 1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

### PART 2 - PRODUCTS

#### 2.1 SOURCE LIMITATIONS

- A. Obtain phenolic-core toilet compartments from single source from single manufacturer.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
  - 1. Panels are able to withstand a concentrated load on grab bar of at least **250 lbf** applied at any direction and at any point, without deformation of panel.
- C. Regulatory Requirements: Comply with applicable provisions in ICC A117.1 for toilet compartments designated as accessible.

#### 2.3 PHENOLIC-CORE TOILET COMPARTMENTS

- 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. ASI Accurate Partitions

2. ASI Global Partitions
  3. Bobrick Washroom Equipment, Inc
  4. General Partitions Mfg. Corp
- B. Toilet-Enclosure Style: Floor anchored.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, and Pilaster Construction: Solid phenolic-core material with melamine facing on both sides fused to substrate during manufacture (not separately laminated), and with eased and polished edges. Provide minimum **3/4-inch**- thick doors and pilasters and minimum **1/2-inch**- thick panels. Provide with no-sightline system consisting of door and pilaster lapped edges on strike side of door and door and pilaster lapped edges on hinge side of door (unless continuous hinge is used).
- E. Entrance-Screen Construction: Matching panel construction.
- F. Urinal-Screen Construction: Matching panel construction.
- G. Pilaster Shoes: Formed from stainless steel sheet, not less than **0.031-inch** nominal thickness and **3 inches** high, finished to match hardware.
- H. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design, stainless steel.
- I. Phenolic Compartment Finish: One color in each room.
1. Dark-Core Phenolic: Manufacturer's standard dark color core and edge.
  2. Through-Color Phenolic: Manufacturer's standard solid through-color.
    - a. Color: As selected by Architect from manufacturer's full range.

## 2.4 HARDWARE AND ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories. Mount with through bolts.
1. Hinges: Manufacturer's stainless steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door.
  2. Latch and Keeper: Manufacturer's standard stainless steel, surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.
  3. Coat Hook: Manufacturer's standard stainless steel combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
  4. Door Bumper: Manufacturer's standard stainless steel, rubber-tipped bumper at outswinging doors.
  5. Door Pull: Manufacturer's standard stainless steel pull at outswinging doors that complies

with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.

- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

## 2.5 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: **ASTM B221**.
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless Steel Castings: ASTM A743/A743M.

## 2.6 FABRICATION

- A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Manufacturer's standard corrosion-resistant anchoring assemblies at pilasters and walls, with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Ceiling-Hung Units: Manufacturer's standard corrosion-resistant anchoring assemblies at pilasters and walls, 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: Manufacturer's standard corrosion-resistant anchoring assemblies at pilasters and walls, with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- F. Urinal-Screen Posts: Manufacturer's standard corrosion-resistant anchoring assemblies at posts and walls, 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, inswinging doors for standard toilet enclosures and **36-inch-** wide, outswinging doors with a minimum **32-inch-** wide, clear opening for toilet enclosures designated as accessible.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
    - a. Pilasters and Panels or Screens: **1/2 inch.**
    - b. Panels or Screens and Walls: **1 inch.**
  2. Full-Height (Continuous) Brackets: Secure panels or screens 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.
- B. Floor-Anchored Units: Set pilasters with anchors penetrating not less than **2 inches** into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

#### 3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware in accordance with 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, BATH, AND LAUNDRY ACCESSORIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Public-use washroom accessories.
2. Toilet-compartment occupancy-indicator system.
3. Public-use shower room accessories.
4. Private-use bathroom accessories.
5. Healthcare accessories.
6. Childcare accessories.
7. Underlavatory guards.
8. Custodial accessories.
9. Hand-sanitizer dispensers.

##### B. Related Requirements:

1. Section 088300 "Mirrors" for frameless mirrors.
2. Section 093013 "Ceramic Tiling" for ceramic toilet and bath accessories.

#### 1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

#### 1.3 ACTION SUBMITTALS

##### A. Product Data: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

##### B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

#### 1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, visible silver spoilage defects.
  - 2. Warranty Period: [10][15]<Insert number> years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Toilet-Compartment Occupancy-Indicator Systems: Manufacturer agrees to repair or replace toilet-compartment occupancy-indicator systems that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: [Five]<Insert number> years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: [Two][Five][10]<Insert number> years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design accessories and fasteners to comply with the following requirements:
  - 1. Grab Bars: Installed units are able to resist **250 lbf** concentrated load applied in any direction and at any point.

#### 2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain [**public-use washroom accessories**][**each type of public-use washroom accessory**] from single source from single manufacturer.
- B. Toilet Tissue (Roll) Dispenser:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-

3588 or comparable product by one of the following:

- a. ASI-American Specialties, Inc.
- b. Bobrick Washroom Equipment, Inc
- c. Bradley Corporation

2. Description: Double-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Noncontrol delivery with standard spindle.
5. Capacity: Designed for **4-1/2- or 5-inch-** diameter tissue rolls.
6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Paper Towel (Roll) Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-2860 or comparable product by one of the following:
  - a. ASI-American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc
  - c. Bradley Corporation
2. Description: Lever-actuated mechanism that permits controlled delivery of paper rolls in preset lengths.
3. Mounting: Surface mounted.
4. Minimum Capacity: **8-inch-** wide, **800-foot-** long roll.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
6. Lockset: Tumbler type.

D. Soap Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-4112 or comparable product by one of the following:
  - a. ASI-American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc
  - c. Bradley Corporation
2. Description: Designed for manual operation and dispensing soap in liquid or lotion form.
3. Mounting: Vertically oriented, surface mounted.
4. Materials: #4 Stainless Steel.
5. Lockset: Tumbler type.
6. Refill Indicator: Window type.

E. Grab Bar:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-5806 or comparable product by one of the following:
  - a. ASI-American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc
  - c. Bradley Corporation

2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, **0.05 inch** thick.
  - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. OD: **1-1/4 inches**.
5. Configuration and Length: As indicated on Drawings.

F. Sanitary-Napkin Disposal Unit:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-270 or comparable product by one of the following:
  - a. ASI-American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc
  - c. Bradley Corporation
2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

G. Seat-Cover Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-4221 or comparable product by one of the following:
  - a. ASI-American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc
  - c. Bradley Corporation
2. Mounting: Surface mounted.
3. Minimum Capacity: 250 seat covers.
4. Exposed Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
5. Lockset: Tumbler type.

H. Mirror Unit:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick B-290 Series or comparable product by one of the following:
  - a. ASI-American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc
  - c. Bradley Corporation
2. Frame: Stainless steel, adjustable tilt.
  - a. Corners: Manufacturer's standard.

3. Size: As indicated on Drawings.
4. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

## 2.3 CHILDCARE ACCESSORIES

- A. Source Limitations: Obtain [**childcare accessories**][**each type of childcare accessory**] from single source from single manufacturer.
- B. Diaper-Changing Station:
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Koala Kare KB-310 or comparable product by one of the following:
    - a. ASI-American Specialties, Inc.
    - b. Bradley Corporation
    - c. Diaper Deck & Co.
    - d. Koala Kare Products; Bobrick Washroom Equipment, Inc.
  2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
    - a. Engineered to support minimum of **250 lb** static load when opened.
  3. Mounting: Surface mounted, with unit projecting not more than **4 inches** from wall when closed.
  4. Operation: By pneumatic shock-absorbing mechanism.
  5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
  6. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

## 2.4 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of [**six**]**<Insert number>** keys to Owner's representative.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF TOILET, BATH, AND LAUNDRY ACCESSORIES

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

### 3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION 102800

## SECTION 123213 - MANUFACTURED WOOD-VENEER-FACED CASEWORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Wood-veneer-faced casework.
2. Hardware and accessories.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood blocking for anchoring casework.

#### 1.2 DEFINITIONS

- A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.

#### 1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

#### 1.4 ACTION SUBMITTALS

A. Product Data:

1. Wood-veneer-faced casework.
2. Hardware and accessories.

B. Shop Drawings: For wood-veneer-faced casework.

1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
2. Indicate types and sizes of casework.
3. Indicate manufacturer's catalog numbers for casework.
4. Show fabrication details, including types and locations of hardware.
5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.

C. Samples: For casework and hardware finishes.



- D. Samples for Initial Selection: For casework and hardware finishes.
- E. Samples for Verification: For the following:
  - 1. Casework Finishes: **8-by-10-inch** Samples for each type and color of finish.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish complete touchup kit for each casework finish provided. Include fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged casework finish.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during remainder of construction period.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.
- D. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

#### 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Delamination of components or other failures of glue bond.
    - b. Warping of components.

- c. Failure of operating hardware.
  - d. Deterioration of finishes.
2. Warranty Period: [Five]<Insert number> years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS FOR CASEWORK

- A. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
  - 1. Grade: Premium.
- B. Product Designations:
  - 1. Drawings indicate sizes, configurations, and finish materials of manufactured wood-veneer-faced casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."

### 2.2 WOOD-VENEER-FACED CASEWORK

- 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. Kraftmaid, Inc.
  - 2. Merrilat Cabinetry
- B. Source Limitations: Obtain from single source from single manufacturer.
- C. Design: Face-frame cabinet construction with the following door and drawer-front style:
  - 1. Flush overlay.
- D. Wood Species: White maple.
  - 1. Wood Stain Colors and Finishes: As selected by Architect from casework manufacturer's full range.
- E. Face Veneer Cut: Plain sliced.
- F. Veneer Matching:
  - 1. None required; select and arrange veneers for compatible grain and color.
  - 2. Provide veneers for each cabinet from a single flitch, book and running matched.

- a. Provide continuous matching of adjacent drawer fronts within each cabinet.
3. Provide veneers for each elevation from a single flitch, book and running matched.
  - a. Provide continuous matching of adjacent drawer fronts within each cabinet and end matching between drawer fronts of adjacent cabinets.

G. Grain Direction:

1. Doors: Vertical with continuous vertical matching.
2. Drawer Fronts: Horizontal.
3. Face Frame Members: Lengthwise.
4. End Panels: Vertical.
5. Bottoms and Tops of Units: Side to side.
6. Knee Space Panels: Vertical.
7. Aprons: Horizontal.

H. Exposed Materials:

1. Plywood: Hardwood plywood with face veneer of species indicated, selected for compatible color and grain. Provide backs of same species as faces.
2. Solid Wood: Clear hardwood lumber of species indicated and selected for grain and color compatible with exposed plywood.
3. Edgebanding: Wood veneer of same species as face veneer.

I. Semiexposed Materials:

1. Wood: Provide solid wood or hardwood plywood for semiexposed surfaces unless otherwise indicated.
  - a. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of species similar in color and grain to exposed wood.
  - b. Plywood: Hardwood plywood of species similar in color and grain to exposed wood. Provide backs of same species as faces.

J. Concealed Materials:

1. Solid Wood: With no defects affecting strength or utility.
2. Plywood: Hardwood plywood. Provide backs of same species as faces.
3. Particleboard.
4. MDF.
5. Hardboard.

## 2.3 HARDWARE AND ACCESSORIES

A. Hardware: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

- B. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, Type B01602, self-closing. Provide two hinges for doors less than **48 inches** high, and provide three hinges for doors more than **48 inches** high.
  - 1. Degrees of Opening: 100 degrees.
- C. Wire Pulls: Solid stainless steel wire pulls, fastened from back with two screws.
  - 1. Provide two pulls for drawers more than **24 inches** wide.
- D. 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.
- E. Drawer Slides: ANSI/BHMA A156.9.
  - 1. Manufacturer's standard.
  - 2. Standard Duty (Grade 1): Undermount.
  - 3. General-purpose drawers; provide **100 lb** load capacity.
- F. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with ANSI/BHMA A156.11, Grade 1.
  - 1. Provide a minimum of two keys per lock and six master keys.
  - 2. Provide locks on every door and drawer.
    - a. Master key for up to 500 key changes.
- G. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door unit.
- H. Adjustable Shelf Supports:
  - 1. Pin-type, single-pin metal shelf rests complying with ANSI/BHMA A156.9, Type B04013.

## 2.4 MATERIALS

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: ANSI A208.1, Grade M-2.
- E. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.

## 2.5 FABRICATION

- A. Wood-Veneer-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:
1. Bottoms of Cabinets and Tops of Wall Cabinets: **3/4-inch-** thick, veneer-core hardwood plywood.
  2. Ends of Cabinets: **3/4-inch-** thick, hardwood plywood.
  3. Shelves: **3/4-inch-** thick, veneer-core hardwood plywood or **1-inch-** thick, particleboard-core hardwood plywood.
  4. Base Cabinet Subtops: **3/4-inch-** thick panel product, glued and pinned or screwed. May be provided as an option to base cabinet top frames.
  5. Backs of Cabinets: **3/4-inch-** thick, particleboard-core hardwood plywood where exposed, **1/2-inch-** thick hardwood plywood, dadoed into sides, bottoms, and tops where not exposed.
  6. Drawer Fronts: **3/4-inch-** thick, particleboard-core hardwood plywood or solid hardwood.
  7. Drawer Sides and Backs: **1/2-inch-** thick, solid-wood or veneer-core hardwood plywood, with glued dovetail or multiple-dowel joints.
  8. Drawer Bottoms: **1/4-inch-** thick, veneer-core hardwood plywood, glued and dadoed into front, back, and sides of drawers. Use **1/2-inch-** thick material for drawers more than **24 inches** wide.
  9. Cabinet Doors:
    - a. 48 Inches (1220 mm) or Less in Height: **3/4 inch** thick, with solid hardwood stiles and rails, particleboard or MDF cores, and hardwood face veneers and crossbands.
- B. Filler Strips: Provide as needed to close spaces between casework and walls, ceilings, and equipment. Fabricate from same material and with same finish as casework.

## 2.6 FINISH

- A. Preparation: Sand lumber and plywood before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.
- B. Staining: Remove fibers and dust and apply wash-coat sealer and stain to exposed and semiexposed surfaces as required to provide uniform color and to match approved Samples.
- C. Finishing Closed-Grain Woods: Apply manufacturer's standard two-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat. Topcoat may be omitted on concealed surfaces.
- D. Finishing Open-Grain Woods: Apply manufacturer's standard three-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and two coats of a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat and between topcoats. Topcoats may be omitted on concealed surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Grade: Install casework to comply with same quality standard grade as item to be installed.
- B. Install casework level, plumb, and true in line; shim as required using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within **1/16 inch** of a single plane. Align similar adjoining doors and drawers to a tolerance of **1/16 inch**. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within **1/16 inch** of a single plane. Fasten cabinets to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of **1/16 inch**.
- E. Fasten casework to adjacent units and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Adjust operating hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

### 3.3 FIELD QUALITY CONTROL

### 3.4 CLEANING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123213

## SECTION 123661 - SIMULATED STONE COUNTERTOPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Cultured marble countertops.
  2. Solid surface material countertops.
  3. Quartz agglomerate countertops.
  4. Accessories.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of countertop material.
- B. Shop Drawings:
1. Plans, sections, details, edge and backsplash profiles, and attachment to other work.
  2. Locations and details of joints.
  3. Locations, quantity, and type of supports/brackets.
  4. Direction of directional pattern, if any.
  5. Locations and sizes of cutouts and holes for items installed in countertop.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification:
1. Countertop material, **6 inches** square.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Indicate locations and sizes of cutouts and holes for items installed in countertops or backsplashes.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include product data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

## 1.7 FIELD CONDITIONS

- A. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of countertops by field measurements[ **after base cabinets are installed but**] before countertop fabrication is complete and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work..

## PART 2 - PRODUCTS

### 2.1 SOLID SURFACE MATERIAL COUNTERTOPS

- A. Solid Surface Countertop Type :
  - 1. Grade: [**Premium**][**Custom**][**Economy**][**Match related casework**].
- B. Solid Surface Material: Homogeneous fabrication of mineral fillers and pigments bound together with a matrix of polymers and resins, complying with ISFA 2-01.
  - 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. Affinity Surfaces; a brand of Domain Industries, Inc.
    - b. DuPont; DuPont de Nemours, Inc.
    - c. Formica Corporation
    - d. Wilsonart LLC
  - 2. Colors and Patterns: As selected by Architect from manufacturer's full range.
  - 3. Countertop:



- a. Type: Standard Veneer.
- b. Thickness:
  - 1) ~~3/4-inch~~ thick, solid surface material with front edge built up with same material.
- c. Exposed Edge Treatment: Radius.
- d. Backsplash: Detached straight.
  - 1) Height: 4 inches.
  - 2) Thickness: Matching countertop.
- e. End Splash: None.

## 2.2 ACCESSORIES

- A. Support Brackets:
  - 1. Countertop Security Station:
    - a. Type: Hidden.
    - b. Material: Steel.
    - c. Color: White powder coat.

## 2.3 FABRICATION

- A. Fabricate countertops in sizes and shapes required to comply with requirements indicated.
- B. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate with loose backsplashes for field assembly.
- C. Joints:
  - 1. Fabricate countertops without joints.
- D. Cutouts and Holes:
  - 1. Fittings: Drill countertops in shop for grommets, plumbing fittings, undercounter soap dispensers, and similar items. Provide three grommets in countertop.

## 2.4 INSTALLATION MATERIALS

- A. Particleboard: ANSI A208.1, [**Grade M-2**][**Grade M-2-Exterior Glue**].
- B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch

sanded.

- a. Hardwood Plywood: 0.05 ppm.
  - b. Particleboard: 0.09 ppm.
  - c. MDF More Than 5/16 Inch (8 mm) Thick: 0.11 ppm.
  - d. MDF 5/16 Inch (8 mm) or Less in Thickness: 0.13 ppm.
- C. Adhesive: Product recommended by manufacturer.
- D. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

#### 3.3 INSTALLATION OF SIMULATED STONE COUNTERTOPS

- A. Grade: Install countertops to comply with specified grade.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
  1. Provide cutouts not finished in the shop. 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.
- C. Countertop Installation:
  1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
  2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
4. Install countertops level to a tolerance of **1/8 inch in 8 ft.**, **1/4 inch** maximum. Do not exceed **1/64-inch** difference between planes of adjacent units.
5. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
6. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
7. Secure countertops to subtops with adhesive according to manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
8. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
  - a. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
  - b. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
9. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
10. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
11. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls. Comply with Section 079200 "Joint Sealants."

### 3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semi-exposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches** o.c. Remove protection at Substantial Completion.

END OF SECTION 123661

**PART 1 - GENERAL**

1.01 GENERAL

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.
- B. Mechanical basic requirements.
- C. Electric Motors.
- D. Identification.

1.02 SYSTEM DESCRIPTION

- A. Provide complete and fully operational systems with facilities and services to meet requirements indicated and in accord with applicable codes and ordinances.

1.03 REGULATORY REQUIREMENTS

- A. Fire Protection, Mechanical and Plumbing: Conform to the Rhode Island State Codes.
- B. Obtain and pay for permits and inspections from "Authority Having Jurisdiction".

1.04 SUBMITTALS

- A. Submit under provisions of Division 1.

**PART 2 - PRODUCTS**

2.01 ELECTRIC MOTORS

- A. Manufacturers:
  - 1. U.S.
  - 2. Reliance
  - 3. General Electric
- B. Electric Service: Refer to Division 16 for required electrical characteristics.
- C. Motors: For continuous operation in 40 degrees C environment, and for temperature rise to ANSI/NEMA MG 1 limits.

- D. Single Phase Motors: Split phase, Permanent split capacitor, and Capacitor start per specifications.
- E. Three Phase Motors: Squirrel cage motors to ANSI/NEMA MG 1 Class B, high efficiency type, with thermistor system for motor frame sizes 254T and larger, ball bearings.

## 2.02 MECHANICAL IDENTIFICATION

- A. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light background color.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light background color, minimum 1-1/2 inch (38 mm) diameter.

## **PART 3 - EXECUTION**

### 3.01 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Install plastic nameplates with adhesive.
- C. Install plastic tags with corrosion resistant metal chain.

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Piping insulation, jackets and accessories.
- B. Equipment insulation and covering.
- C. Ductwork insulation, jackets, and lining.
- D. Refrigeration piping
- E. Condensate drain pipping

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation and insulation products when ambient temperatures and conditions are not as required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature before, during, and after installation for minimum period of 24 hours.

**PART 2 - PRODUCTS**

2.01 PIPE INSULATION

- A. Manufacturers:
  - 1. Knauf or approved equal
- B. Glass Fiber: ASTM C547; rigid molded, noncombustible.
  - 1. 'K' ('Ksi') Value: 0.24 at 75 degrees F (0.035 at 24 degrees C).
  - 2. Maximum service temperature:850 degrees F.
  - 3. Vapor Barrier Jacket: White kraft paper with glass fiber yarn and bonded to aluminized film, secured with self-sealing longitudinal laps and butt strips or with outward clinch expanding staples and vapor barrier mastic.
- C. Jackets:

1. PVC Plastic: One piece molded type fitting covers and sheet material, off-white color.
  - a. Thickness:20 mil.
  - b. Connections:Pressure sensitive color matching vinyl tape.

## 2.02 EQUIPMENT INSULATION

### A. Manufacturers:

1. Knauf or approved equal

### B. Flexible Mineral Fiber Blanket: ASTM C553; flexible, noncombustible.

1. 'K' ('Ksi') value: 0.24 at 75 degrees F (0.035 at 24 degrees C).
2. Maximum service temperature:250 degrees F.
3. Density: 2.0 lb/cu ft (32 kg/cu m) density.
4. Vapor Barrier Jacket: Kraft paper with glass fiber yarn and bonded to aluminized film, secured with self-sealing longitudinal laps and butt strips or with outward clinch expanding staples and vapor barrier mastic.

## 2.03 DUCTWORK INSULATION

### A. Manufacturers:

1. Knauf or approved equal

### B. Flexible Glass Fiber: ASTM C553; flexible, noncombustible blanket.

1. 'K' ('Ksi') Value: 0.29 at 75 degrees F (0.042 at 24 degrees C).
2. Vapor Barrier Jacket: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, secured with pressure sensitive tape.

### C. Rigid Glass Fiber: ASTM C612; rigid, noncombustible blanket.

1. 'K' ('Ksi') Value: 0.29 at 75 degrees F (0.042 at 24 degrees C).
2. Density: 3.0 lb/cu ft (48 kg/cu m).
3. Vapor Barrier Jacket: Kraft paper with glass fiber yarn and bonded to aluminized film, secured with pressure sensitive tape.

### D. Duct Liner: ASTM C1071; flexible, noncombustible blanket with [poly vinyl acetate polymer] [acrylic polymer meeting ASTM G21 and ASTM G22] impregnated surface and edge coat.

1. 'K' ('Ksi') Value: ASTM C1071.
2. Maximum Velocity on Coated Air Side: 5,000 ft/min (25.4 m/s).
3. Adhesive: Waterproof fire-retardant type.
4. Liner Fasteners: Galvanized steel, self-adhesive pad or welded with press-on head.

## **PART 3 - EXECUTION**

**3.01 EXAMINATION AND PREPARATION**

- A. Verify that ductwork has been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

**3.02 INSTALLATION**

- A. Install Work in accordance with written manufacturer's instructions.
- B. Install duct liner in accordance with NAIMA Fibrous Glass Duct Liner Standard.
- C. Continue insulation vapor barrier through penetrations.
- D. Piping Insulation:
  - 1. Locate insulation and cover seams in least visible locations.
  - 2. Neatly finish insulation at supports, protrusions, and interruptions.
  - 3. Insulate complete system of pipes conveying fluids below ambient temperature.
  - 4. For fiber glass insulated pipes conveying fluids above ambient temperature, provide standard jackets.
  - 5. Bevel and seal ends of insulation at equipment, flanges, and unions.
  - 6. Provide insert between support shield and piping on piping 2 inches (50 mm) diameter or larger. Fabricate of cork or other heavy density insulating material suitable for temperature, not less than 6 inches (150 mm) long.
  - 7. Provide Zeston fitting or approved with fiberglass insulation blanket on all fittings.
  - 8. For exterior applications, provide vapor barrier jacket. Insulate pipe, fittings, joints, and valves and finish with glass mesh reinforced vapor barrier cement. Cover with [aluminum] [stainless steel] jacket with seams located on bottom side of horizontal piping.
  - 9. All pipe insulation shall be continuous through ALL hangers
- E. Equipment Insulation:
  - 1. Apply insulation as close as possible to equipment by grooving, scoring, and bevelling insulation, if necessary. Secure insulation to equipment with studs, pins, clips, adhesive, wires, or bands.
  - 2. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.
  - 3. For fiber glass insulated equipment containing fluids above ambient temperature, provide standard jackets, with or without vapor barrier.
  - 4. Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.



5. When equipment with insulation requires periodic opening for maintenance, repair, or cleaning, install insulation in such a manner that it can be easily removed and replaced without damage.

**F. Duct Liner:**

1. Adhere insulation with adhesive for 100 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing.
3. Seal liner surface penetrations with adhesive.
4. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

**3.3 SCHEDULES**

**A. Piping Insulation:**

1. Domestic Hot and Cold Water and Hot Water Return and Condensate Drain Piping:
  - a. Glass Fiber Insulation.
    - 1) Pipe Size Range: All.
    - 2) Thickness: 1" Cold Water and 1 1/2" Hot Water and Hot Water Return.
2. Hot Water Heating Supply and Return including: 1 1/2" Glass Fiber
3. Refrigerant Suction:
  - a. 1 1/2" Armaflex or approved equal

**B. Ductwork Insulation:**

1. Exhaust Ducts: All in attics and unheated mechanical spaces:
  - a. Flexible Glass Fiber: 1 1/2" inch thick.
  - b. Rigid Glass Fiber: 1 1/2" inch thick.
2. Exhaust Ducts Exposed to Outdoor Air: Including all attic
  - a. Flexible Glass Fiber: 1 1/2" inch thick.
3. Supply and Return (in attics) Ducts (Cooling Systems): All: Including all attic and mechanical spaces.
  - a. Flexible Glass Fiber: Concealed Ductwork: 1 1/2" inch thick.
  - b. Rigid Glass Fiber: Exposed Ductwork 1 1/2" inch thick
4. Outside Air Intake Ducts: All: Including all in attics:
  - a. Flexible Glass Fiber: 1 1/2" inch thick.
5. Breeching: All
  - a. Rigid glass fiber: 2".
6. Where indicated on Drawings.

**END OF SECTION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION:**

- A. This section of the specifications includes the furnishing, installation, and connection of the microprocessor controller, addressable reporting fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, fire alarm control panel, auxiliary control devices, enunciators, and wiring as shown on the drawings and specified herein.
- B. The fire alarm system shall comply with requirements of NFPA standard No. 72 for protected premises signaling systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.
- C. By Fire-Lite Company or approved equal.
- D. Furnish and install new master box with transmitting reporting method to comply with all requirements of the Town of Richmond. Reporting location and requirements obtain approval from "Authority Having Jurisdiction".
- E. Furnish and install Knox Box at main entrance per Architects approval.
- F. Furnish and install 1 million candela beacon on building per approval of AHJ.

**1.02 SCOPE:**

- A. An existing addressable fire alarm control panel, (FACP) , devices and wiring that reporting to a microprocessor controlled fire detection system is presently installed and will be modified in accordance with the Specifications and Drawings.
- B. Basic Performance:
  - 1. Alarm, trouble and supervisory signals from all intelligent addressable reporting devices shall be encoded onto a Class B (NFPA Style 4), or Class A (NFPA Style 6, 7) Signaling Line Circuit (SLC).
  - 2. Initiation Device Circuits (IDCs) shall be wired Class B (NFPA Style B) or Class A (NFPA Style D).
  - 3. Notification Appliance Circuits shall be wired Class B (NFPA Style Y) or Class A (NFPA Style Z)
  - 4. Digitized electronic signals shall employ check digits or multiple polling.
  - 5. A single ground or open on the system Signaling Line Circuit (SLC) shall not cause system malfunction, loss of operating power or the ability to report an alarm.

6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.

**C. BASIC SYSTEM FUNCTIONAL OPERATION**

1. When a fire alarm condition is detected and reported by one of the system initiating devices the following functions shall immediately occur:
  - a. The System Alarm LED shall flash.
  - b. A local piezo electric signal in the control panel shall sound.
  - c. A 40 character, backlit LCD display shall indicate all information associated with the Fire Alarm condition, including the type of alarm point and its location within the protected premises.
  - d. Printing and history storage equipment shall log the information associated with each new Fire Alarm Control Panel condition, along with time and date of occurrence.
  - e. All system output programs assigned via control by event equations to be activated by the particular point in alarm shall be executed, and the associated System Outputs (alarm Notification Appliances and/or Relays) shall be activated.

**1.03 SUBMITTALS**

**A. General:**

1. Ten copies of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent equipment (compatible UL-Listed) from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

**B. Shop Drawings:**

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show remote enunciator(s) layout, configurations, and terminations.

**C. Manuals:**

1. Submit simultaneously with the shop drawings, 3 complete operating and maintenance manuals listing the manufacturer's name(s) including technical data sheets.

2. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

D. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.04 GUARANTEE:

- A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of Certificate of Occupancy. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.05 MAINTENANCE:

- A. Maintenance and testing shall be on a semiannual basis or as required by the local AHJ. A preventive maintenance schedule shall be provided by the Contractor that shall describe the protocol for preventive maintenance. The schedule shall include:
  1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, water flow switches and all accessories of the fire alarm system.
  2. Each circuit in the fire alarm system shall be tested semiannually.
  3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 Chapter 7.

1.06 POST CONTRACT EXPANSIONS:

- A. The contractor shall provide parts and labor to expand the system specified, if so requested, for a period of one (1) year from the date of Certificate of Occupancy.
- B. As part of the submittal include a quotation for all parts and material, and all installation and test labor as needed to increase the number of addressable devices by ten percent (10%). This quotation shall include smoke detectors, heat detectors, addressable manual stations, addressable monitor modules and addressable control modules equal in number to one tenth of the number required to meet this specification (list actual quantity of each type).

- C. Quotation shall include installation and test labor and labor to reprogram the system for this 10% expansion. If additional FACP hardware would be required, include the material and labor necessary to install this hardware.
- D. Submittals that do not include this estimate of post contract expansion cost will not be accepted.

**1.07 APPLICABLE SPECIFICATIONS:**

- A. The specifications and standards listed below form a part of this specification. The system shall fully comply with these standards.
  - 1. National Fire Protection Association (NFPA) - USA:
    - No. 70 National Electrical Code (NEC)
    - No. 72 Central Station Signaling Systems
    - No. 72 Protective Signaling Systems
    - No. 72 Automatic Fire Detectors
    - No. 72 Notification Appliances for Protective Signaling Systems.
    - No. 72 Testing Procedures for Signaling Systems.
    - No. 101 Life Safety Code
  - 2. Underwriters Laboratories Inc. (UL) - USA:
    - No. 268 Smoke Detectors for Fire Protective Signaling Systems
    - No. 864 Control Units for Fire Protective Signaling Systems
    - No. 268ASmoke Detectors for Duct Applications.
    - No. 521 Heat Detectors for Fire Protective Signaling Systems
    - No. 464 Audible Signaling Appliances.
    - No. 38 Manually Actuated Signaling Boxes.
    - No. 346 Waterflow Indicators for Fire Protective Signaling Systems.
    - No. 1971 Visual Notification Appliances for the hearing impaired.
  - 3. Local and State Building Codes
  - 4. All requirements of the Authority Having Jurisdiction (AHJ).

**1.08 APPROVALS:**

- A. The system shall have proper listing and/or approval from the following nationally recognized agencies:
  - 1. UL Underwriters Laboratories Inc.
  - 2. FM Factory Mutual Systems
  - 3. CSFM California State Fire Marshal
  - 4. MEA NYC Materials and Equipment Acceptance
  - 5. ULC Underwriters Laboratories of Canada

**PART 2 - PRODUCTS**

**2.01 EQUIPMENT AND MATERIAL, GENERAL:**

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system.
- B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- C. All Equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

**2.02 CONDUIT AND WIRE:**

- A. Conduit:
  - 1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
  - 2. All wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
  - 3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
  - 4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
  - 5. Conduit shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
  - 6. Conduit shall be 3/4 inch (19.1 mm) minimum.
  - 7. Die-Cast fittings are not acceptable.
- B. Wire:
  - 1. All fire alarm system wiring shall be new.
  - 2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for

Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.

3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall be RI Fire Code Approved and properly color marked and have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR). RI Fire "MC" alarm wire properly marked can only be used in concealed spaces and with written approval by the Engineer.
5. Wiring used for the multiplex communication loop shall be twisted and shielded and installed in conduit unless specifically excepted by the fire alarm equipment manufacturer. The system shall permit use of IDC and NAC wiring in the same conduit with the communication loop.
6. All field wiring shall be completely supervised.

C. Terminal Boxes, Junction Boxes and Cabinets:

D. All boxes and cabinets shall be UL listed for their use and purpose.

E. Notification appliance circuits shall be arranged to serve like categories (manual, smoke, water flow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to addressable reporting devices.

F. The Fire Alarm Control Panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the Main Power Distribution Panel as FIRE ALARM. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG. The Control Panel Cabinet shall be grounded securely to either a cold water pipe or grounding rod.

### 2.03 MAIN FIRE ALARM CONTROL PANEL:

A. The existing FACP is a FIRE·LITE Model MS-9050 UD which contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: addressable detectors, addressable modules, printer, enunciators, and other system controlled devices.

B. System Capacity and General Operation

1. The control panel shall provide, or be capable of expansion to 99 addressable detectors and 99 monitor or control modules (198 addressable devices)
2. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit, 40-character Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the Field Programming and control of the Fire Alarm System.

3. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
4. The FACP shall provide the following features:
  - a. Maintenance Alert to warn of excessive detector dirt or dust.
  - b. System Status Reports to display or printer.
  - c. Smoke Detector Alarm Verification.
  - d. Presignal, meeting NFPA 72 requirements.
  - e. Rapid manual station reporting (under 3 seconds).
  - f. Periodic Detector Test, conducted automatically by the control panel every two hours.
  - g. March time, temporal (ANSI Cadence) and California Code coding options.
  - h. Walk Test, with check for two detectors set to same address.
5. The main CPU shall contain Form-C relay contacts rated at 2.0 amps/30VDC for the following: Alarm, Trouble, Supervisory.
6. The CPU shall contain two Class A or B (NFPA Style Y or Z) programmable Notification Appliance Circuits.

**C. Central Microprocessor**

1. The Microprocessor shall communicate with, monitor, and control all external interfaces with the control panel. It shall include EPROM for system program storage; non-volatile memory for building-specific program storage; and a "watch dog" timer circuit to detect and report microprocessor failure.
2. The Microprocessor shall contain and execute all programming for specific action to be taken if an alarm condition is detected by the system. Such programming shall be held in non-volatile programmable memory and shall not be lost if both the system primary and secondary power failure occurs.
3. The Microprocessor Unit shall also provide a Real- Time Clock for time annotation of system displays, printer, and history file.

**D. Display**

1. The Display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The Display shall include status information and custom alphanumeric labels for all Addressable Detectors, Addressable Modules and Software zones.
3. The Display shall provide a 40-character backlit alphanumeric Liquid Crystal Display (LCD). It shall also provide 5 Light-Emitting-Diodes (LEDs), consisting of and not limited to the following: AC POWER, FIRE ALARM, SYSTEM TROUBLE, ALARM SILENCE, AND SUPERVISORY.
4. The Display shall provide a 21-key touch key-pad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.



5. The Display shall include the following operator switches: ALARM SILENCE, SYSTEM RESET (also serving as a lamp test switch), DRILL, and ACKNOWLEDGE/STEP.

**E. Signaling Line Circuit Interface**

1. The SLC Interface shall provide power to, and communicate with, all of the Addressable Detectors and Addressable Modules over a single pair of wires. This SLC Loop shall be capable of NFPA Style 4, Style 6, or Style 7 operation.
2. The SLC interface shall receive information from all Addressable Detectors. This information shall be processed to determine whether normal, alarm, or trouble conditions exist for each detector. This information may also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
3. The Signaling Line Circuit shall be capable of distances of 10,000 feet (@ 12 AWG, twisted/shielded). For retrofit applications, the system shall support up to 1,000 feet of untwisted, unshielded wire.

**F. Serial Interfaces**

1. An EIA-232 interface between the Fire Alarm Control Panel and UL Listed Electronic Data Processing (EDP) peripherals shall be provided as an option. The EIA-232 interface shall allow the use of printers, or for an interface to an off-line PC programmer. Alternately, the EIA-232 port shall be capable of conversion to an EIA-485 (terminal mode) port for the serial connection of optional LCD, English language remote system displays. The system shall support a maximum of 32, LCD-type annunciators on a single, twisted shielded pair. Simple led-type remote annunciators are not acceptable substitutes as remote system displays. The maximum distance to the furthest annunciator shall be 3,000 feet.
2. An EIA-485 port shall be available for the serial connection of optional remote led-type annunciators. The system shall support a maximum of 32, led-type remote annunciators on a single twisted, shielded pair. The maximum distance to the furthest annunciator shall be 6,000 feet.

**G. Enclosures:**

1. The control panel shall be housed in a UL listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators.
3. An optional semi-flush trim ring shall be available for a neat cabinet dress.

- H. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.**

- I. Optional plug-in modules shall be provided for NFPA 72 auxiliary and remote station fire alarm systems as well as a Digital Alarm Communicator Transmitter for NFPA 72 Central Station systems. The DACT (FIRE-LITE model UDACT-F) shall meet all current UL requirements for delayed AC fail reporting.
- J. An optional module (FIRE-LITE Model RTM-8F) shall provide eight Form-C relays rated at 5.0 amps, Municipal box connection, and reverse polarity connection. Relays shall track programmable software zones.
- K. Power Supply:
  1. The Power Supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP. a 240 VAC, 50 Hz version shall be available where required.
  2. It shall provide a minimum of 3.0 amps of usable Notification Appliance power. An optional expansion transformer (FIRE(LITE Model XRM-24) shall be available to expand system Notification power to 6.0 amps to meet the demanding requirements of ADA and UL-1971.
  3. It shall provide a battery charger for 60 hours of standby using dual-rate charging techniques for fast battery recharge.
  4. It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults on sensitive addressable modules.
  5. It shall be power-limited using fuseless, quick-acting electronic circuitry meeting the latest UL requirements.
- L. Operators Controls
  1. Acknowledge Switch:
    - a. Activation of the control panel Acknowledge switch in response to new Alarms and/or Troubles shall silence the local panel piezo electric signal and change the Alarm and Trouble LEDs from flashing mode to steady-ON mode. If multiple Alarm or Trouble conditions exist, depression of this switch shall advance the 40-character LCD display to the next Alarm or Trouble condition.
    - b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
  2. Signal Silence Switch: Activation of the Signal Silence Switch shall cause all programmed Notification Appliances and relays to return to the normal condition after an alarm condition. The selection of Notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
  3. System Reset Switch: Activation of the System Reset Switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition. Holding the RESET switch shall perform a Lamp Test function.

4. Drill (Evacuate) Switch: Press and hold of the Drill switch shall activate all Silenceable Notification Appliance circuits. The Drill function shall latch until press of Signal Silence or Reset.

**M. Printer**

1. The Printer shall provide hard-copy printout of all changes in status of the system and shall time-stamp such printouts with the current time-of-day and date. The printer shall communicate with the control panel using an interface complying with Electrical Industries Association standard EIA-232D.

**N. Field Programming**

1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
2. All programming may be accomplished through the standard FACP keypad.
3. All field defined programs shall be stored in non-volatile memory and shall not be lost if AC mains and/or battery is lost.
4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.
5. Program edit shall not interfere with normal operation and fire protection. If a fire condition is detected during programming operation, the system shall exit programming and perform fire protection functions as programmed.
6. A special program check function shall be provided to detect common operator errors.
7. An Auto-Program (self-learn) function shall be provided to quickly program initial functions within several seconds. During this operation, smoke detectors connected to the Signaling Line Circuit shall be automatically installed without labor intensive operator key commands.
8. For flexibility, an optional off-line programming function, with batch upload/download, shall also be available.

**O. Specific System Operations**

1. Alarm Verification: The Fire alarm control panel shall have the ability to alarm verify addressable smoke detectors.
2. Point Disable: Any device in the system may be Enabled or Disabled through the system keypad.
3. Point Read: The system shall be able to display or print the following point status diagnostic functions:
  - a. Device Status
  - b. Device Type
  - c. Device Label

- d. Device Zone Assignments
- e. Program Parameters
- 4. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status.
- 5. System History Recording and Reporting: The Fire Alarm Control Panel shall contain a History Buffer that will be capable of storing up to 500 system alarms, troubles, or operator actions.
- 6. Automatic Detector Maintenance Alert: The Fire Alarm Control Panel shall automatically interrogate each Addressable Smoke Detector and shall analyze the detector responses over a period of time.
  - a. If any addressable Smoke Detector in the system responds with a reading that is below or above normal limits, then the system will enter the Trouble Mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
- 7. Software Zones: The FACP shall provide 56 software zones. All addressable devices may be field programmed to be grouped into these zones for control activation and annunciation purposes. Systems that utilize limited programmability, such as general alarm operation, are unacceptable.

#### 2.04 SYSTEM COMPONENTS:

- A. Programmable Electronic Sounders
  - 1. Electronic sounders shall operate on 24 VDC nominal.
  - 2. Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones (Temporal Pattern) with an output sound level of at least 90 dBA measured at 10 feet from the device.
  - 3. Shall be flush or surface mounted as shown on plans.
- B. Strobe Lights:
  - 1. Shall operate on 24 VDC nominal.
  - 2. Shall meet the requirements of the ADA (Americans with Disabilities Act) as well as UL Standard 1971.
- C. Audible/Visual Combination Devices:
  - 1. Shall meet the applicable requirements of Section A listed above for audibility.
  - 2. Shall meet the requirements of Section B listed above for visibility.
- D. Addressable Manual Pull Box (FIRE·LITE Model BG-10LX)
  - 1. Addressable Manual Stations shall be provided to connect to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops. Up to 99 addressable manual stations may be connected to one SLC loop.

2. The Manual Pull Box shall, on command from the Control Panel, send data to the panel representing the state of the manual switch. Manual Fire Alarm Stations shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
3. All operated stations shall have a positive, visual indication of operation that cannot be reset without the use of a key.
4. Manual Stations shall be constructed of LEXAN (or polycarbonate equivalent) with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.
5. Stations shall be suitable for surface mounting, or semiflush mounting as shown on the plans, and shall be installed in accordance with ADA and local codes.
6. The Manual Station shall provide address-setting means using decimal switches. Addressable manual stations that use binary address setting methods, such as a dip switch, are much more difficult to install and are subject to installation error, and are not allowable substitutes.

**E. Addressable Photoelectric Detectors (FIRE·LITE model SD300)**

1. Smoke detectors shall be addressable and shall connect with two wires to the Fire Alarm Control Panel Signaling Line Circuit. Up to 99 addressable detectors may connect to the SLC loop.
2. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density.
3. The detectors shall be ceiling-mount and shall include a twist-lock base with a removable terminal block.
4. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a switch) or initiated remotely on command from the control panel.
5. The detectors shall provide address-setting means on the detector head using decimal switches. Because of the possibility of installation error, systems that use binary jumpers on dip-switches to set the detector address are not acceptable. The detectors shall also store an internal identifying code that the control panel shall use to identify the type of detector.
6. The detectors shall provide an alarm and power LED. The LED shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. The LED is placed into steady illumination by the control panel indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED (FIRE-LITE Model RA400Z).

**F. Addressable Ionization Smoke Detectors (FIRE·LITE Model CP300)**

1. Smoke Detectors shall be addressable and connect with two wires to the Fire Alarm Control Panel Signaling Line Circuit. Up to 99 addressable detectors may connect to one SLC loop.
2. The detectors shall use the dual-chamber ionization principle to measure products of combustion.
3. The detectors shall be ceiling-mount and shall include a twist-lock base and a removable terminal block.
4. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself, by activating a switch, or may be activated remotely on command from the control panel.
5. The detectors shall provide address-setting means on the detector head using decimal switches. Because of the possibility of installation error, systems that use binary jumpers or dip-switches to set the address are not acceptable. They shall also store an internal identifying code that the control panel shall use to identify the type of detector.
6. The detectors shall provide an alarm and power LED. The LED shall flash under normal conditions. The LED is placed into steady illumination by the control panel, indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect a remote alarm LED (FIRE(LITE Model RA400Z).

**G. Addressable Monitor Module (FIRE·LITE Model M300)**

1. Addressable Monitor modules shall be provided to connect one supervised IDC (zone) of conventional Alarm Initiating Devices (any N.O. dry contact device) to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loop.
2. The monitor module shall mount in a 4-inch square, 2-1/8" deep electrical box.
3. The IDC (zone) may be wired for Style D (Class A) or Style B (Class B) operation. The Monitor module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Fire Alarm Control Panel shall use to identify the type of device. Modules that use binary jumpers or dip-switches are subject to installation errors and are not acceptable. An LED shall be provided that shall flash under normal conditions, indicating that the Monitor module is operational and in regular communication with the control panel.
4. For difficult to reach areas, the Monitor Module shall be available in a miniature package and shall be no larger than 2-3/4" x 1-1/4" x 1/2" (FIRE(LITE Model M301). This version does not support Style D operation or include an LED.

**H. Addressable Control Module (FIRE·LITE Model C304)**

1. Addressable Control Modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized Audio/Visual appliances. For fan

shutdown and other auxiliary control functions, the control module may also be set to operate as a dry contact relay.

2. The Control Module shall mount in a standard 4-inch square, 2-1/8" deep electrical box, or to a surface mounted backbox.
3. The NAC shall wire in a Class B (Style Y) or Class A (Style Z) fashion. Each control module shall support up to 1 Amp of Inductive or 2 Amps of Resistive Audible/Visual signals. Configured as a Form-C relay, it shall support no less than a 1 amp/30 VDC load. The relay coil shall be magnetically latched to reduce wiring connection requirements and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
4. Audio/Visual power shall be provided by a separate supervised power Loop from the main Fire Alarm Control Panel or from a supervised, UL listed Remote Power Supply.
5. The Control Module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Control Panel shall use to identify the type of device. Modules that use binary jumpers or dip-switches are subject to installation errors and are not acceptable. An LED shall be provided that shall flash under normal conditions, indicating that the Control Module is operational and is in regular communication with the control panel.
6. A magnetic test switch shall be provided to test the module without opening or shorting its NAC circuit wiring.

**I. Isolator Module (FIRE·LITE Model I300).**

1. Isolator Modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The Isolator Module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the Isolator Module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the Isolator Module shall automatically reconnect the isolated section of the SLC loop.
3. The Isolator Module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an Isolator Module after its normal operation.
4. The Isolator Module shall mount in a standard 4-inch deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the Isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

**J. Flow and tamper switches: Furnish and install all Code required flow and tamper switch compatible with this addressable fire alarm system.**

**2.05 BATTERIES:**

**A. Batteries:**

1. Shall be 12 volt, Gell-Cell type (two required).
2. Battery shall have sufficient capacity to power the fire alarm system for not less than sixty hours plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

**PART 3 - EXECUTION**

**3.01 INSTALLATION:**

- A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- E. Install all necessary wire and equipment and programming to operate smoke and fire dampers (fd/sd).

**3.02 TEST:**

- A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.
  1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
  2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
  3. Verify activation of all flow switches.
  4. Open initiating device circuits and verify that the trouble signal actuates.
  5. Open and short signaling line circuits and verify that the trouble signal actuates.
  6. Open and short Notification Appliance Circuits and verify that trouble signal actuates.
  7. Ground all circuits and verify response of trouble signals.



8. Check presence and audibility of tone at all alarm notification devices.
9. Check installation, supervision, and operation of all addressable smoke detectors using the Walk Test.
10. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
11. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying the controls performance by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

**3.03 FINAL INSPECTION:**

- A. At the final inspection, a manufacturer trained representative shall demonstrate that the system functions properly in every respect.

**3.04 INSTRUCTION:**

- A. Provide instruction as required for operating the system. "Hands-on" demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.
- B. The Contractor and/or the Systems Manufacturer's representatives shall provide a typewritten "Sequence of Operation" to the Owner if required.

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Pipe and pipe fittings, valves.
- B. Plumbing Specialties: Roof and floor drains, interceptors, cleanouts, backflow preventers, water hammer arrestors, thermostatic mixing valves, hose bibs/hydrants.
- C. Plumbing Fixtures.
- D. Plumbing Equipment.

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.

**PART 2 - PRODUCTS**

2.01 SANITARY SEWER PIPING, WASTE AND VENT, BURIED AND ABOVE GRADE

- A. Copper Tube: ASTM B306, type DWV with cast bronze or wrought copper fittings and Grade 50B solder joints.
- B. ABS Pipe: ASTM D2680 or D2751 with solvent weld joints.
- C. PVC Pipe: ASTM D2729 with solvent weld joints. All joints shall have purple joint primer applied per manufacturer instructions.
- D. CAST IRON EXISTING PIPING: Connect to existing with Code compliant adapters as necessary.

2.02 WATER PIPING, BURIED UNDER BUILDING

- A. Copper Tubing: Type K ASTM B42, annealed without fittings.

2.03 WATER PIPING, ABOVE GRADE

- A. Copper Tubing: ASTM B88 (ASTM B88M), Type L hard drawn, with cast brass or wrought copper fittings and Grade 95TA solder joints. Use only lead free solder and install per manufacturer written instructions.

**2.04 FLANGES, UNIONS, AND COUPLINGS**

- A. Pipe Size 3 Inches (80 mm) and Under: Malleable iron unions for threaded ferrous piping; bronze unions for soldered copper pipe joints.
- B. Pipe Size Over 1 Inch (25 mm): Forged steel flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets.

**2.05 BALL VALVES**

- A. Manufacturers: Watts or approved equal
- B. Up to 4 Inches (100 mm): Bronze two piece body, chrome plated ball, regular port, Teflon seats and stuffing box ring, lever handle, solder or threaded ends.
- C. All valves to be full port ball valves.

**2.06 SWING CHECK VALVES**

- A. Less than 2 Inches (50 mm):
  - 1. Manufacturers: Watts or approved equal
  - 2. Bronze body, bronze swing disc, renewable disc and seat, flanged or grooved ends. Full port.

**2.07 SPRING LOADED CHECK VALVES**

- A. Manufacturers: Watts or approved equal
- B. Bronze body, bronze trim, spring loaded, bronze disc, rubber seals, wafer ends.

**2.08 RELIEF VALVES**

- A. Manufacturers :Watts or approved equal
- B. Bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

**2.09 STRAINERS**

- A. Size 2 inch (50 mm) and Under:
  - 1. Manufacturers: Watts or approved equal
  - 2. Screwed brass or iron body, Y pattern with stainless steel perforated screen.

**2.10 FLOOR DRAINS**

- A. Manufacturers: Zurn or approved equal
- B. Floor Drain (FD-1):
  - 1. Manufacturers: See schedule

#### 2.11 CLEANOUTS

- A. Finished Floor:
  - 1. Manufacturers: Zurn or approved equal
  - 2. Lacquered cast iron body with anchor flange, reversible clamping collar, and adjustable nickel-bronze round scored cover in service areas and round depressed cover to accept floor finish in finished floor areas.
- B. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
- C. PVC.

#### 2.12 HOSE BIBS/HYDRANTS

- A. Interior Hose Bibs:
  - 1. Manufacturers: Zurn or approved equal
  - 2. Bronze or brass, replaceable hexagonal disc, hose thread spout, chrome plated with vacuum breaker.
- B. Wall Hydrant:
  - 1. Manufacturers: Zurn or approved equal
  - 2. Non-freeze, self-draining type with chrome plated hose thread spout, removable key, and vacuum breaker.

#### 2.13 FLUSH VALVE WATER CLOSETS

- A. See Schedule on drawings

#### 2.14 LAVATORIES

- A. See Schedule on drawings

#### 2.15 SINKS

- A. See Schedule on drawings

#### 2.16 WATER CLOSETS

- A. See Schedule on drawings

#### 2.17 SHOWERS

A. See Schedule on Drawings.

#### 2.18 WATERLESS URINALS

A. See schedule on Drawings.

#### 2.19 WATER SHOCK SUPPRESORS.

A. Watts sized by Contractor with approval of Engineer.

A. See Schedule and location on Drawings.

### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION AND PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside piping before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Coordinate cutting or forming of roof or floor construction to receive drains to required invert elevations.

E. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

F. Verify adjacent construction is ready to receive rough-in work of this Section.

G. Provide all necessary code compliant connectors to connect to existing cast iron below grade piping.

#### 3.2 INSTALLATION

A. Install Work in accordance with written manufacturer's instructions.

B. Provide dielectric connections wherever joining dissimilar metals.

C. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

- E. Provide clearance for installation of insulation and access to valves and fittings.
- F. Slope water piping and arrange to drain at low points. Minimum of 1/8 " per foot.
- G. Install bell and spigot pipe with bell end upstream.
- H. Install specialties in accordance with manufacturer's instructions.
- I. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- J. Install each fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.
- K. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
- L. Install all piping with hanger rods of less than 12" or provide seismic bracing and supports necessary to meet all the requirements per International Building Code. Provide all material and labor to meet these requirements.

### 3.3 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers. All
- D. Install ball valves type circuit setters or approved equal for throttling, bypass, or manual flow control services.

### 3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

- B. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual. Bleed water from outlets to ensure distribution.
- C. Maintain disinfectant in system for 24 hours. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- D. Flush disinfectant from system. Take samples no sooner than 24 hours after flushing and analyze in accordance with AWWA C601.
- E. Collect disinfected water in approved container and dispose of offsite properly.

3.5 SCHEDULES: See drawings

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Schedule 40 PVC piping and fittings with PVC welded cement and purple primer. For Condensate piping.

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.

**PART 2 - PRODUCTS**

2.01 HEATING WATER PIPING: NOT APPLICABLE

- A. Steel Pipe: ASTM A53, Schedule 40, black, malleable iron or forged steel fittings, threaded or welded joints.
- B. Copper Tubing: ASTM B88, Type L hard drawn, cast brass, wrought copper fittings and Grade 95TA solder joints. Use only lead free solder and install per manufacturer written instructions.
- C. Copper Tubing: Type K ASTM B42 annealed without fittings.

2.02 EQUIPMENT DRAINS, CONDENSATE DRAINS AND OVERFLOWS

- A. Copper Tubing: ASTM B88, Type L hard drawn, cast brass, wrought copper, or mechanically extracted fittings, lead free solder joints.
- A. PVC Piping: Schedule 40 solvent welded with purple primer applied per manufacturer's requirements.

**PART 3 - EXECUTION**

3.01 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient. Install piping to conserve building space, and not interfere



with use of space and other work. Group piping whenever practical at common elevations.

- B. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- C. Provide clearance for installation of insulation, and access to valves and fittings.
- D. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- E. Install specialties and equipment in accordance with manufacturer's instructions.
- F. Support tanks inside building from building structure.
- G. Provide manual air vents at system high points.
- H. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- I. Provide air separator on suction side of system circulation pump and connect to expansion tank.
- J. Provide valved drain and hose connection on strainer blow down connection.
- K. Provide relief valves on pressure tanks, low pressure side of reducing valves, heat exchangers, and expansion tanks.
- L. Furnish and install pressure gages where show on drawings with ¼" ball valve shutoffs.
- M. Support piping adjacent to pump such that no weight is carried on pump casings. For close coupled or base mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches (100 mm) and over.
- N. Provide line sized shut-off valve and strainer on pump suction, and line sized check valve and balancing valve on pump discharge.
- O. Install all pipe with hanger rods of less than 12" or provide seismic support and bracing per all requirements of the International Building Code (2003). Provide all material and labor necessary to meet these requirements.

- P. Furnish and install condensate drain piping from AHU-1 and AHU-2 as shown on Drawings.

### 3.02 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- C. Install ball valves type circuit setters by B&G (or approved equal) for throttling, bypass, or manual flow control services.
- D. Use ball valves in heating water systems.
- E. Provide 3/4 inch ball drain valves at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Refrigerant piping.
- B. Refrigerant specialties.
- C. Controls and control panels.

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.

**PART 2 - PRODUCTS**

2.01 PIPING

- A. Copper Tubing: All: Type ACR hard drawn, wrought copper fittings, silver braze joints.

2.02 REFRIGERANT

- A. Refrigerant: R-22 or 410A

2.03 REFRIGERANT SPECIALTIES

- A. Manufacturers:
  - 1. Refrigeration Research Corp. or approved equal
- B. Moisture and Liquid Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator and plastic cap.
- C. Diaphragm Packless Valves: UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, solder or flared ends.
- D. Packed Angle Valves: Forged brass, forged brass seal caps with copper gasket, rising stem and seat, molded stem packing, solder or flared ends.
- E. Packed Ball Valves: Two piece forged brass body with Teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals.

- F. Straight Line or Angle Line Type Strainers: Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass.
- G. Straight Line, Non-Cleanable Type Strainers: Steel shell, copper plated fittings, stainless steel wire screen.
- H. Globe Type Check Valves: Cast bronze or forged brass body, forged brass cap with neoprene seal, brass guide and disc holder, phosphor-bronze or stainless steel spring, Teflon seat disc.
- I. Straight Through Type Check Valves: Brass body and disc, phosphor-bronze or stainless steel spring, neoprene seat.
- J. Straight Through or Angle Type Pressure Relief Valves: Brass body and disc, neoprene seat, factory sealed and ASME stamped.
- K. Replaceable Cartridge Angle Type Filter Driers: UL listed, brass shell and bronze cap, perforated brass shell and molded desiccant filter core.
- L. Permanent Straight Through Type Filter Driers: UL listed, steel shell with molded desiccant filter core.
- M. Solenoid Valves:
  - 1. Valve: Pilot operated, copper or brass body and internal parts, synthetic seat, stainless steel stem and plunger assembly, with flared, solder, or threaded ends. Stem shall permit manual operation in case of coil failure.
  - 2. Coil Assembly: UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector and color coded lead wires, integral junction box.
- N. Expansion Valves:
  - 1. Angle or Straight Through Type: Brass body, internal or external equalizer, adjustable super heat setting, replaceable inlet strainer, with replaceable capillary tube and remote sensing bulb well.
  - 2. Selection: Select for maximum load at design operating pressure and minimum 10 degrees F (6 degrees C) super heat.
- O. Receivers: UL listed, steel, with tappings for inlet, outlet, and pressure relief valve.
- P. Flexible Connectors: Corrugated bronze hose with single layer of exterior braiding, minimum 9 inches (230 mm) long with copper tube ends.

**2.04 CONDENSING UNITS: NOT APPLICABLE**

- A. Manufacturers:
  - 1. Trane
  - 2. Carrier
  - 3. York
  
- B. Units: Self-contained, packaged, factory assembled and prewired units for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver.
  
- C. Cabinet: Galvanized steel with baked enamel finish and removable access doors or panels with quick fasteners.
  
- D. Compressor: Scroll, 1750 rpm, resiliently mounted compressor with positive lubrication, crankcase heater, cylinder unloaders with electric solenoids, motor overload protection, service valves, and filter drier.
  
- E. Condenser:
  - 1. Coil: Seamless copper tubing with aluminum fins.
  - 2. Fans: Vertical discharge, direct drive axial fans, resiliently mounted with guard and motor.
  - 3. Motors: Permanently lubricated ball bearing motors with built-in current and overload protection.
  - 4. Seismic: Provide any necessary restraint attachments to comply with all Seismic requirements of the International Building Code (2003).
  
- F. Controls:
  - 1. High and low pressure cutouts for compressor, oil pressure control, non-recycling pump-down, and reset relay.
  - 2. Low ambient controls to permit operation down to 20 degree F ambient temperature.
  - 3. Timer circuits to prevent rapid loading and unloading of compressor.
  
- G. Performance: See schedule
  
- H. Electrical Characteristics: See electrical

**PART 3 - EXECUTION**

**3.01 INSTALLATION: FOR RELOCATING EXISTING AHU UNITS IN MENS AND WOMENS ROOMS PER DRAWING.**

- A. Install equipment and specialties in accordance with manufacturer's instructions.

- B. Install piping to conserve building space and not interfere with use of space. Route piping in orderly manner, parallel to building structure, and maintain gradient. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
- C. Provide non-conducting dielectric connections when joining dissimilar metals.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Provide clearance for installation of insulation and access to valves and fittings.
- E. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.
- F. Install flexible connectors parallel to compressor shaft.
- G. Provide for connection to electrical service. Refer to Division 16.
- H. Install units on pads provided
- I. Pressure test system with dry nitrogen to 200 psig (1470 kPa). Perform final tests at 27 inches (92 kPa) vacuum and 200 psig (1470 kPa) using electronic leak detector. Test to no leakage.
- J. Charge system with refrigerant and put system into operation, and test equipment performance. Provide cooling season start-up, and winter season shut-down for first year of operation.
- K. Install all condensing units to all seismic requirements of the International Building Code (2003). Provide all material and labor necessary to meet these requirements.

### 3.02 APPLICATION

- A. Provide line size liquid indicators in main liquid line leaving condenser, or if receiver is provided, in liquid line leaving receiver.
- B. Provide line size filter dryer per manufacturers written installation instructions upstream of each automatic valve. Where multiple expansion valves with integral strainers are used install single main liquid line strainer.
- C. Provide permanent filter-driers in all systems and on all circuits.

- D. Provide filter-driers in liquid line adjacent to receivers and for each solenoid valve.
- E. Provide refrigerant charging (packed angle) valve connections in liquid line between receiver shut-off valve and expansion valve.
- F. Utilize flexible connectors at or near compressors where piping configuration does not absorb vibration.
- G. Move existing AHU units in men's and women's bathroom. Disconnect existing refrigerant Remove existing refrigerant per industry standards, disconnect control wiring, remove AHU, remove existing support, disconnect all electric circuits, relocate existing support, install AHU's (2) in new location per Drawing M1.0, connect refrigerant piping, add new refrigerant piping as required, evacuate refrigerant piping, connect control wiring, connect required ductwork and recommission AHU's (2).

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Air Handling Units.
- B. Bathroom Fan (EF-3) and Restroom Inline Exhaust Fans (EF-1 and EF-2)

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.

1.03 QUALITY ASSURANCE

- A. Fans shall bear AMCA Certified Rating Seal.
- B. Perform Work in kitchen hood exhaust systems in accordance with NFPA 96.

1.04 MAINTENANCE

- A. Furnish one extra set of filters for each unit.

**PART 2 - PRODUCTS**

2.01 AIR HANDLING UNITS: EXISTING TO BE RELOCATED PER DRAWINGS

- A. Manufacturers:
  - 1. EXISTING
- B. Configuration: Fabricate with fan plus accessories, including:
  - 1. Cooling coil section.
  - 2. Heating coil section.
  - 3. Filter section.
  - 4. Plenums Inc. mixing box.
  - 5. Fan section.
  - 6. Discharge section.
  - 7. Bases where scheduled
- C. Performance Base: Sea level conditions.
- D. Fabrication: Conform to AMCA 99 and ARI 430.



- E. Casing: galvanized steel on channel base or drain pan, welded and coated with zinc chromate paint, with lights with wire guards.
- F. Insulation: One inch (25 mm) thick, glass fiber insulation, applied between inside and outside walls.
- G. Inspection Doors: 10 x 10 inches (250 X 250 mm) of galvanized steel flush mounted.
- H. Weatherproof Casing Finish: Seal fixed joints with flexible weather tight sealer. Seal removable joints with closed-cell foam gasket. Provide cap strips over roof flanges. Provide rain caps and gaskets on access doors.
- I. Fan Section:
  - 1. Fan: Forward curved centrifugal type fan.
  - 2. Bearings: Self-aligning, grease lubricated, ball or roller bearings with lubrication fittings extended to exterior of casing.
  - 3. Base: Welded steel, motor factory mounted on slide rails, with hinged doors, built-in welded steel inertia base. Mount base on open spring vibration isolators.
  - 4. Mounting: Locate motor, drive, and belt guard on integral casing framework on exterior of casing.
  - 5. Fan Accessories: Extended lubrication lines.
  - 6. Shafts: Solid hot rolled steel with key-way.
  - 7. V-Belt Drive: Cast iron or steel sheaves, bored to fit shafts and keyed, variable and adjustable pitch sheaves for motors 15 hp and under, fixed sheave for 20 hp and over, matched belts, and drive rated minimum 1.5 times nameplate rating of motor.
  - 8. Belt Guard: Fabricate to SMACNA HVAC Duct Construction Standards - Metal and Flexible.
  - 9. VFD: Provide variable frequency drive for AHU #1 and AHU #2
- J. Disconnect Switch: Factory mount disconnect switch on equipment under provisions of Section 16000.
- K. Coil Section: Enclose coils with headers and return bends fully contained within casing, with coils and access.
- L. Filters:
  - 1. Angle arrangement with 2 inches (50 mm) deep disposable panel filters.
- M. Dampers:
  - 1. Mixing Box: Outside and return air dampers of galvanized steel in galvanized frame, with steel axles in nylon or bronze bearings, in opposed

blade arrangement with damper blades positioned across short air opening dimension.

2. Damper Leakage: Maximum 2 percent at 4 inches wg (1 kPa) differential pressure when sized for 2000 fpm (10 m/s) face velocity.

N. Seismic Requirements.

1. Provide all Air Handling Units with International Building Code (2003) seismic restraining devices necessary to comply with these requirements.

**2.02 EXHAUST FANS AND BATHROOM FANS**

A. Inline Fans (EF-1 and EF-2): Inline CaptiveAire fans

B. Bathroom Exhaust Fan (EF-3) Broan ceiling fan

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. Install Work in accordance with written manufacturer's instructions.
- B. Install air handling units on bases where scheduled.
- C. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.
- D. Install fans with resilient mountings and flexible electrical leads. Install flexible connections specified between fan inlet and discharge ductwork. Flexible connectors shall not be in tension while running.
- E. Provide sheaves required for final air balance.
- F. Provide all necessary equipment, material and labor needed to comply with all Seismic requirements of the International Building Code.

**3.02 SCHEDULES**

- A. See drawings schedule.

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Filters.
- B. Ductwork and ductwork accessories.
- C. Volume control dampers.
- D. Diffusers, boots, registers, grilles.

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.
- B. Samples: Submit sample of replacement filter media with frame.
- C. Operating and Maintenance Instructions: Include instructions for lubrication, filter replacement, spare parts lists, and wiring diagrams

**PART 2 - PRODUCTS**

2.01 FILTERS

- A. Supplied with Air Handling Unit Filter Rack
- B. All filter to be MERV 8

2.02 DUCTWORK

- A. Materials
  1. Steel Ducts: Galvanized steel sheet, lock-forming quality.
  2. Flexible Ducts: Fabric supported by helically wound spring steel wire or flat steel bands.
  3. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by vapor barrier jacket.
  4. Sealant: Non-hardening, water resistant, fire resistive, used alone or with tape.
  5. Spiral ductwork and fittings : Prefabricated.
  6. All ductwork to be steel. "Flex" duct will not be allowed.
- B. Metal Ductwork

1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible except as indicated.
2. Construct T's, bends, and elbows with radius of 1-1/2 times width of duct on center line. Where not possible provide turning vanes.
3. Increase duct sizes gradually, not exceeding 30 degrees divergence and 45 degrees convergence.
4. Connect flexible ducts to metal ducts with [liquid adhesive plus tape.] [draw bands.] [adhesive plus sheet metal screws.]
5. Use crimp joints with or without bead for joining round duct sizes 8 inch (200 mm) and smaller with crimp in direction of air flow.

#### 2.03 VOLUME CONTROL DAMPERS.

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Fabricate splitter dampers of material same gage as duct to 24 inches (600 mm) size in either direction, and two gages heavier for larger sizes. Secure with continuous hinge or rod. Operate with minimum 1/4 inch (6 mm) diameter rod.
- C. Fabricate single blade dampers for duct sizes to 12 x 30 inch (300 x 760 mm).
- D. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72 inch (300 x 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- E. Except in round ductwork 12 inches (300 mm) and smaller, provide end bearings.
- F. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where width exceeds 30 inches (750 mm) provide regulator at both ends.

#### 2.04 FIRE DAMPERS AND SMOKE/FIRE DAMPERS: NOT APPLICABLE

##### 1. FIRE DAMPERS

- A. Manufacturers: Ruskin:Dynamic type
- B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.
- C. Fabricate curtain type dampers with blades out of air stream except for 1.0 inch (250 Pa) pressure class ducts up to 12 inches (300 mm) in height.
- D. Rated for use in 3 hour fire partition.

**2.05 BACKDRAFT DAMPERS. On all fans per schedule on M2.0**

- A. Manufacturers: Carnes or approved equal
- B. Gravity backdraft dampers, size 18 x 18 inches (457 x 457 mm) or smaller, furnished with air moving equipment, may be air moving equipment manufacturers standard construction.
- C. Fabricate multi-blade, parallel action gravity balanced backdraft dampers of galvanized steel, or extruded aluminum, with center pivoted blades, with sealed edges, linked together, steel ball bearings, and plated steel pivot pin.

**2.06 AIR TURNING DEVICES/EXTRACTORS: WHERE APPLICABLE**

- A. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.
- B. Multi-blade device with radius blades attached to pivoting frame and bracket, steel or aluminum construction, with push-pull operator strap.

**2.07 FLEXIBLE DUCT CONNECTIONS:**

- A. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, approximately 3 inches (75 mm) wide, crimped into metal edging strip.  
**FLEXIBLE DUCT INSULATED OR NOT INSULATED WILL NOT BE PERMITTED**

**2.08 DUCT ACCESS DOORS**

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- B. Access doors smaller than 12 inches (300 mm) square may be secured with sash locks. Access doors with sheet metal screw fasteners are not acceptable.

**2.09 AIR OUTLETS**

- A. Manufacturers: Hart & Cooley
- B. Ceiling Diffusers: Round, Rectangular, stamped or spun, multi-core type diffuser to discharge air in 360 degree pattern, with sectorizing baffles where

indicated; radial opposed blade damper and equalizing grid; baked enamel off-white finish.

- A. Registers/Grilles: Streamlined and individually adjustable blades, one-way and two-way deflection damper with factory finish.
- B. Diffusers:
  - 1. For wooden ceilings: Model A500 Series, with OBDs.
  - 2. For wood ceilings: Model SD without OBD's
- E. Return and Exhaust Grilles: Model RH90

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install flexible connections specified between fan inlet and discharge ductwork. Flexible connectors shall not be in tension while running.
- C. Provide backdraft dampers on discharge of exhaust fans and as indicated.
- D. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.
- E. Install filter gage static pressure tips upstream and downstream of filters. Mount filter gages on outside of filter housing or filter plenum, in accessible position. Adjust and level.
- F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage.
- G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- H. Slope underground ducts to plenums or low pump out points at 1:500. Provide access doors for inspection. Coat buried ductwork with one coat and seams and joints with additional coat of asphalt base protective coating. Where applicable.
- I. Connect diffusers to low pressure ducts with 5 feet (1.5 m) maximum length of flexible duct. Hold in place with strap or clamp.

- J. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- K. Provide fire dampers and smoke/fire dampers at locations indicated. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- L. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- M. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch (200 x 200 mm) size for hand access, 18 x 18 inch (450 x 450 mm) size for shoulder access.
- N. Support terminal units individually from structure. Do not support from adjacent ductwork. Provide minimum of 5 ft (1.5 m) of 2 inch (50 mm) thick lined ductwork downstream of units.
- O. Check location of air outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- P. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.
- Q. Paint ductwork visible behind air outlets and inlets matte black. Refer to Division 9.
- R. Provide complete coordination drawing per Drawing Note.

### 3.2 SCHEDULES

- A. See drawings

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 SUMMARY:**

- A. Individual Unit Electric Controls: NIC
- B. Air Handler Control Systems: NIC
- C. Instruments and control elements: NIC
- D. All electric wiring high and low voltage (24, 120, and 208 volt) required for complete system.
- E. Sequence of operation
- F. Lighting Controls (VIVE) per Drawings.

**1.2 RELATED DOCUMENTS:**

- A. Drawings and General Provisions of the contract, including General and Special Conditions, Division 1 Specification Sections and Section 11000 apply to work of this section.

**1.3 SUBMITTALS:**

- A. Copies of all shop drawings and product data sheets required to establish compliance with these specifications shall be submitted to the Engineer in accordance with Section 01340.
- B. Shop Drawings: For review indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences.
  - 1. Include trunk cable schematic showing programmable control unit locations, and trunk data conductors.
  - 2. List connected data points, including connected control unit and input device.
  - 3. Label with settings, adjustable range of control and limits. Include written description of control sequence.
  - 4. Include flow diagrams for each control system, graphically depicting control logic.
  - 5. Include description and sequence of operation of operating, user, and application software.
  - 6. Submit schedule of valves indicating size, flow, and pressure drop for each valve.
  - 7. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.



- C. Product Data: For review provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- D. Operation and Maintenance Instructions: For project closeout include:
  - 1. Systems descriptions, set points, and controls settings and adjustments.
  - 2. Inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
  - 3. Interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.

#### 1.4 SYSTEM DESCRIPTION:

- A. Automatic Temperature Control System(s): NIC.
- B. Electric controls for AHU'S and ACCU'S: NIC
- C. VIVE Controls for all new lighting per Drawings.
- D. Electric controls for electric unit heaters (EUH-1), exhaust fans (EF-1 and EF-2) to remain. Rewire as necessary for complete system.
- E. Include installation and calibration, supervision, adjustments and fine tuning necessary for complete and fully operational system.
- F. The Control Contractor not Electrical Contractor to furnish and install all equipment and material including all conduit and wire for a complete control system. This work included but is not limited to all voltages (24, 120 and 208) for a complete system.

#### 1.5 MAINTENANCE:

- A. Provide manufacturer's maintenance services on control system for one year from Date of Substantial Completion.
- B. Include complete service of controls systems, including call backs. Make minimum of six complete normal inspections of approximately four hours duration in addition to normal service calls to inspect, calibrate, and adjust controls, and submit written reports.

## **PART 2 - PRODUCTS**

### 2.1 VIVE LOTRON SYSTEM MANUFACTURERS:

- A. Manufacturers:

1. LUTRON (VIVE)

2.2 AIR HANDLER CONTROLS:

2.2.1 NIC.

2.3 UNIT HEATERS (UH), CABINET UNIT HEATERS (CUH) AND GAS FIRED UNIT HEATERS (GUH)

2.3.1 ELECTRIC CONTROLS.

- A. Furnish and install Single-Stage Room Thermostats (Trane model 350-0014-01) and related wiring and conduit to UH's, CUH's and GUH's to provide a complete system.

2.4 FANS

2.4.1 ELECTRIC CONTROLS

- A. EF-1 and EF-2: Furnish and install all wiring and conduit required to operate these new fans from existing control/wall switches.
- B. EF-4: Furnish and install all wiring and conduit required to operate EF-3 from wall timer on wall outside room 130 to two door operator control with fan EF-1.
- C. EF-6 and CF-1's wired by Electrical Contractor.

2.4.1 ELECTRIC CONTROLS

- A. Furnish and install boiler controller to provide control of boiler (B-1), oil transfer pump and circulators (2). Circulators to be controlled for lead/lag operation.
- B. Furnish and install controls to operate hot water zone valve with unit furnished thermostat.

**PART 3 - EXECUTION**

3.1 EXAMINATION AND PREPARATION:

- A. Verify that conditioned power supply is available to the panels and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.
- B. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

**3.2 INSTALLATION:**

- A. Install Work in accordance with manufacturer's instructions.
- B. Furnish and install all devices, conduit and wire regardless of voltage (24, 120 and 240) for a complete control system. Wire devices provided by equipment manufactures as part of these Specifications.
- B. Furnish and install all conduit and electrical wiring where required for a complete control system. Refer to Section 16.
- C. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.
- D. Install panels and other hardware in position on permanent walls where not subject to excessive vibration.
- E. Check and verify location of thermostats and other exposed control sensors with plans and room details before installation. Locate 60 inches (1 500 mm) above floor. Align with lighting switches.
- F. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.

**3.3 EXISTING ELECTRIC UNIT HEATERS (EUH), AND CABINET UNIT HEATERS (CUH): TO REMAIN**

**3.4 EXHAUST FANS (EF):**

- A. EF-1 and EF-2: Operate using existing Controls.
- B. EF-3: Operate through VIVE System.
- C. Other EF Fans NIC to remain

**3.7 EXISTING WATER HEATER.**

- A. Existing controls to remain.

**3.12 SCHEDULES:**

A. See drawings

**END OF SECTION**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Air systems.
- B. Commissioning Report

1.02 SUBMITTALS

- A. Requirements of Drawings and General Provisions of the contract, including General and Special Conditions and Division 1 of this Specification, apply to work of this section.
- B. Draft Reports: Submit for review prior to final acceptance of Project.
- C. Test Reports: Submit prior to final acceptance of project and for inclusion in operating and maintenance manuals. Provide in soft cover, letter size, 3-ring binder, with index page and tabs, and cover identification. Include reduced scale drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
- D. Report Forms: AABC National Standards for Total System Balance forms.
- E. Commissioning Report.

**PART 2 - PRODUCTS - not used**

**PART 3 - EXECUTION**

3.01 AGENCIES

- A. Votta. Or approved equal

3.02 EXAMINATION AND PREPARATION

- A. Before commencing work, verify that systems are complete and operable.
- B. Report any defects, deficiencies, or abnormal conditions in mechanical systems which prevent system balance.
- C. Beginning of work means acceptance of existing conditions.

- D. Recorded data shall represent actually measured or observed condition.
- E. Permanently mark settings of valves, dampers, and other adjustment devices. Set and lock memory stops.

### 3.03 INSTALLATION TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent for supply systems and plus or minus 10 percent for return and exhaust systems of design.
- B. Air Outlets and Inlets: Adjust to within plus or minus 10 percent of design.

### 3.04 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.
- B. Make air quantity measurements in ducts by traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers.
- E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Allow for 50 percent loading of filters.
- G. Adjust automatic outside air, return air, and exhaust air dampers for design conditions.
- H. Measure temperature conditions across outside air, return air, and exhaust air dampers to check leakage.
- I. Where modulating dampers are provided, take measurements and balance at extreme conditions.

### 3.05 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.

- B. Use calibrated fittings or equipment and pressure gages to determine flow rates for system balance. Where not installed, base flow balance on temperature difference across heat transfer elements.
- C. Effect system balance with automatic control valves fully open to heat transfer elements.
- D. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings.

3.06 Commissioning Report.

- A. Provide a Commissioning Report to demonstrate that **all** the SCOPE building systems, which service the renovated areas, are in proper working condition. Include but not limited to operating each system in its full range of operational conditions both for summer cooling and winter heating to ensure that all design conditions are met. Provide to Engineer a Commissioning Procedure for approval before starting the commissioning. The Commissioning Procedure will provide details of how each system will be commissioned. Provide for the following systems: Both new and existing equipment (for equipment which service the renovated area): Hot water heating, exhaust fan systems and new or existing air handling unit systems. Obtain approval of Engineer on final Commissioning report.

**END OF SECTION**

**PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

A. DIVISION 1 – GENERAL CONDITIONS is hereby made a part of this Section.

1.02 SCOPE OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, and includes:

1. Grounding system including building steel and foundation steel.
2. Additional Breakers for existing Distribution panelboards.
3. Panelboards.
4. Feeders to panels.
5. Conduit work.
6. Wire and cable work including telephone and data
7. Branch circuit wiring to all outlets and devices.
8. Outlets and devices.
9. Lighting fixtures, lamps and controls.
10. Exit lights
11. Telephone and data sleeves pull wires and outlet boxes for future use.
12. Fire Alarm system.
13. Wiring for heating and cooling equipment.
14. Temporary (construction) light and power.
15. Nameplates, and tags.
16. Telephone, data, TV and communication conduit and wiring and outlet boxes.
17. Mechanical and Plumbing Contractor provided disconnects.
18. RIDOT Video Surveillance SYSTEM

B. Items to be installed only: Install the following items as furnished by the designated sections:

1. Section (15500) - HEATING, VENTILATING AND AIR CONDITIONING
  - a. Equipment disconnects.

C. Items to be furnished and installed: Furnish the following items for installation by the designated sections:

1. Section (15500) - HEATING, VENTILATING AND AIR CONDITIONING
  - a. Duct heat and smoke detectors

1.03 SUBMITTALS

A. Material and equipment requiring shop drawing and product data submittal shall include but shall not be limited to:

1. Breakers for Distribution Panelboards
2. Panelboards



3. Wire and Cable
4. Conduit and fittings
5. Switches
6. Outlets and Devices
7. Lighting fixtures, lamps, controls, and contractors
8. Fire Alarm System.
9. Lighting control system (VIVE)
10. RIDOT Video Surveillance System

#### 1.04 GUARANTEE/WARRANTY

- A. Manufacturer(s), Contractor, and Subcontractor(s) shall provide their standard guarantees/warranties for their work under this Section. Such guarantees/warranties shall be in addition to and not instead of all other liabilities, which the manufacturer(s), Contractor and the Subcontractor(s) may have by law, or by other provisions of the Contract Documents.
- B. The guarantee/warranty shall be in addition to and not instead of all other liabilities which manufacturer(s); Contractor and Subcontractor(s) may have by law or by other provisions of the Contract Documents.

#### 1.05 REFERENCES

- A. National standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable subject to their timely submission, review and acceptance by the Architect.
  1. The RHODE ISLAND:ICC:MECHANICAL, PLUMBING AND ENERGY CODES 2019
  2. National Electric Code: NEC : NFPA 70 2020
  3. RILSC 2018 NFPA 101 : RIFC 2018
  4. National Fire Protection Association (NFPA) 72 & 101
  5. Local/State Ordinances
  6. IES – for lighting system
  7. NEMA, UL, ANSI for materials and equipment
  8. Americans with Disabilities Act (ADA)

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Refer to contract general requirements for requirements pertaining to Product Delivery, Storage and Handling.

#### 1.07 RECORD DRAWINGS

- A. Record Drawings shall be submitted at the completion of the Project and conform to the contract general requirements.

**1.08 OPERATING AND MAINTENANCE (O&M) DATA**

- A. O&M data is to be provided for equipment supplied in a coordinated and organized form.
- B. Refer to contract special provisions for submittal procedures pertaining to operating and maintenance data.

**PART 2 - PRODUCTS**

**2.01 RACEWAYS**

- A. Electrical metallic tubing (EMT) shall be zinc-coated steel that conforms to industry standards, by Republic Steel, Allied Tube and Conduit, Triangle/PWC or approved equal. EMT couplings and connectors shall be of the compression type. Adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system. Select features were not otherwise indicated, as required to complete wiring system and to comply with NEC. EMT or Rigid tubing to be used in all exposed area.
- B. No aluminum conduit shall be used.
- C. Metal-clad MC type cable is allowed for installation above ceiling from the junction boxes to the wall outlets/switches. Wiring between junction boxes and branch circuit home runs shall be in EMT. Concealed areas only.
- D. Flexible metallic conduit shall be galvanized, spiral wrapped metallic conduit (Greenfield) or liquid-tight flexible metallic conduit as specified for specific equipment. Only in concealed areas
- E. Conduit fire seal fittings shall have heat-activated intumescent material for fire rating equal to or higher than that of floor or wall by O.Z./Gedney or approved equal.
- F. PVC conduit for under slab and site underground wiring. Furnish and install per written manufactures installation instructions written.

**2.02 OUTLET BOXES**

- A. Outlet boxes on concealed work shall be sized as required by the number of devices indicated on the plans, galvanized pressed steel with plaster rings as required. Outlet boxes for exposed conduit work shall be cast aluminum alloy with cast aluminum alloy covers.
- B. Where installed in plaster, boxes shall be fitted with galvanized steel plaster covers of required depth to finish flush with finished wall or ceiling.

- C. Switch boxes, receptacle boxes and other outlet boxes shall be sized as required with plaster rings or gang cover as required.
- D. Outlet boxes shall be by Steel City Electric Company, Appleton Electric Company, National Electric Products Company or approved equal. Boxes on opposite sides of wall or partition shall not be installed back-to-back, even if shown that way on the plans. Boxes shall be offset 6" CL to CL.
- E. Outlet boxes for various systems and components shall be as required by manufacturer.
- F. Plastic boxes are unacceptable.

### 2.03 JUNCTION BOXES, PULL BOXES AND CABLE TROUGHS

- A. Provide code gauge galvanized steel junction and pull boxes for conduit 1-1/4 in. trade size and larger, where indicated and as necessary to facilitate installation, of required dimensions, with accessible removable screw-on covers. Provide junction and pull boxes in special sizes and shapes determined in field where necessary.
- B. Junction box covers shall be readily accessible. Do not install junction boxes above suspended ceilings except where ceiling is removable or where access panel is provided.
- C. Sheet metal pull boxes shall be supported adequately to maintain shape. Larger boxes shall have structural steel bracing welded into rigid assembly formed adequately to maintain alignment in shipment and installation. Secure covers with corrosion-resistant screws or bolts.
  - 1. Pull boxes exposed to rain or in wet locations shall be weatherproof.
  - 2. Provide clamps, grids and other appurtenances to secure cables. No cable shall be unsupported for more than 30 inches.
  - 3. No pull box shall be within 2 feet of another.

### 2.04 WIRE AND CABLE 600 V INSULATION

- A. Provide single-conductor, annealed copper wire and cable with insulation rated 600 V of sizes specified and scheduled on Drawings, by Rome, Okonite or approved equal, for secondary service, feeders, branch and system wiring. Wire insulated for 300 V may be used where voltage is less than 100V, if isolated from higher voltages. Wire sizes shown and specified are American Wire Gauge for copper.
- B. Wire #10 and larger shall be stranded; #12 and smaller shall be solid. Wire and cable shall have THW, THHN, THWN or XHHN insulation as required.

- C. Motor control circuits and signal wiring may be #14 if NEC requirements are met. Branch circuits longer than 75 ft. for 120 V shall be at least #10 from panel to last outlet.
- D. Wiring within light fixtures and other high-temperature equipment shall have 150 degrees C insulation as required by NEC.
- E. Minimum size wiring for power and lighting circuits shall be No. 12 AWG. Control wiring and low voltage systems shall be minimum No. 14 AWG.
- F. Splices and Terminations
  - 1. Make splices in branch circuit wiring with UL-listed, solder less connectors rated 600V, of sizes and types required by manufacturer's recommendation with temperature rating equal to those of wires. Splice connectors shall be screw-on. Insulate splices with integral covers or with plastic or rubber friction tape to preserve characteristics of wire and cable insulation.
  - 2. Provide standard bolt-on lugs with hex screws to attach copper wire and cable to Panelboards, switchboards, disconnect switches and electrical equipment.
  - 3. Ampacity of splices and connectors shall be equal to those of associated wires and cables.
- G. Telephone, Data and TV.
  - 1. Telephone and Data wire shall be Cat 5E 4 pair 22-gauge Belden catalog number 5983. TV cable to be standard commercial use coaxial cable.
  - 2. All Telephone, Data and TV wire shall be home runs from the device to the specific hub or main control unit in the room(s) as indicated on the Drawings.

**2.05 FEEDER IDENTIFICATION**

- A. Provide laminated phenolic identifying tags pressure-sensitive labels for cables, feeders, and power circuits in pull boxes, switchboard rooms, at cable termination and in other locations.
- B. Tags or labels shall be incised to show 1/2 inch high white letter on a black background. The operating voltage of the specific feeder and/or branch circuit shall determine background color. Suspended tags with two 1/32-inch diameter nylon 55-pound test shall be attached monofilament line or two slip-free plastic cable lacing units.

**2.06 COLOR CODING**

- A. Color code secondary service, feeders and branch circuit conductors as follows:

<i>208/120 Volts</i>	<i>3-Phase</i>	<i>480/277 Volts</i>	<i>3-Phase</i>
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Black	A	Brown	A
Red	B	Orange	B
Blue	C	Yellow	C
White	Neutral	Natural Grey	Neutral
Green (only)	Ground	Green Only	Ground

B. Colors shall be factory-applied entire length of conductors by one of the following methods except as noted and limited below:

1. Solid color compound,
2. Solid color coating,

C. Branch circuit conductors #12 and #10 shall have solid color compound, solid color coating or colored fibrous covering. Neutrals and equipment grounds shall have solid compound or solid color coating (white, gray and green).

#### 2.07 WIRE PULLING EQUIPMENT (where applicable)

- A. Provide polyethylene ropes for pulling wire.
- B. Provide fish wires in telephone/data conduits and other empty conduit systems required, without splices and with ample exposed lengths at each end.
- C. Provide wire pulling lubricants that meet applicable UL requirements as necessary.

#### 2.08 WIRING DEVICES

A. Provide UL listed, heavy duty, specification grade wiring devices by single manufacturer: Arrow-Hart (Division of Crouse-Hinds), Leviton, Hubbell or approved equal. Devices shall be WHITE.

B. Toggle Switches:

1. Single-pole shall be 20A. 120-277 V AC.
2. Double-pole shall be 20A. 120-277 V AC.
3. Three-way shall be 20A. 120-277 V AC.
4. Four-way shall be 20A. 120-277 V AC.

C. Receptacles:

1. Duplex shall be 125 V, 20 A, 2-pole, 3 W, grounding.
2. GFI Devices shall be 125 V, 20 A, 2-pole, 3 W, grounding

**2.09 WIRING DEVICE PLATES**

- A. Provide device plates by Arrow-Hart, Bryant, Hubbell or approved equal.
- B. All device plates shall be White or Brown/gray per Engineer and similar in appearance to each other on the same ganged line up.
- C. Nameplate designations for device plates shall be engraved directly on plates and filled in.
- D. Telephone/data outlet plates are provided and installed by this Contractor.
- E. Device plates shall be by manufacturer of wiring devices.
- F. Receptacle device plates for circuits other than 120 V, 2-wire, shall be engraved with 1/4-inch letters, filled red, indicating voltage characteristics and circuit number of outlet.
- G. Outlets shall be flush to surface.
- H. All switches shown for one location shall be grouped under one place. Where a dimmer switch is included, all switches shall have the same cover plate as the dimmer switch.
- I. Die-cast fittings are not acceptable.

**2.10 LIGHTING FIXTURES**

- A. Provide lighting fixtures, equipment and components were shown on Drawings, as listed in fixture schedules and as specified, wired and assembled. Provide approved aligned canopies, hangers and other appurtenances as required.
  - 1. HID fixtures shall have high power factor, potted and encapsulated ballasts, sound rating A and voltage indicated on fixture schedule, and shall be CBM-certified. Ballasts shall be by Advance Electric, GE or approved equal. Furnish the following manufacturer's Ballast Performance Data:
    - a. Volt-watt trace.
    - b. Input watts and output watts through a lamp's life.
    - c. Power factor through a lamp's life cycle.
  - 2. Fluorescent fixtures shall have low loss, high-energy efficiency, high power factor, 120 V ballasts, with sound rating A and shall be CBM-certified. Fluorescent lighting fixtures shall have Type P SLH or approved equal by GE Provide fuse holder and fuse for each ballast. Fluorescent lamps shall be energy saving lamps.
  - 3. Tungsten-halogen lamps shall be rated 120 v.
  - 4. Incandescent lamps shall be inside-frosted, extended service.

5. All lighting to be LED per Lighting Schedule on Drawing E2.0
  6. Lighting System to be controlled by VIVE System
  7. RIDOT interior and exterior Video Surveillance System
- B. Verify ceiling constructions, and provide fixtures, ballasts, frames, rings and other accessories suitable for construction encountered.
- C. Coordinate installation of fixtures with installation of ceiling materials and suspension system.
1. Ceiling-mounted fixtures shall be supported independent of hung ceiling with bow chain in two opposite corners.
  2. In no case shall lighting fixtures be suspended or supported from hung ceiling, conduit or duct. Fixtures shall be supported from structural members only.
  3. Provide unistrut below ducts from which to hang fixtures when fixture locations coincide with duct runs. Provide threaded rods to support unistrut.
  4. Investigate lighting fixture locations and supports to ensure that no interference exists between lighting fixture, supports and other equipment. Correct interferences as directed by Architect.
- D. Refer to fixture schedule for specific lamp requirements.
- E. Incandescent and tungsten halogen lamps shall not be operated other than for initial testing, before final inspection.
- F. Provide polyester covers to protect fluorescent fixtures with parabolic louvers during construction. Contractor to completely remove the protective cover as part of final cleaning.
- G. Emergency Exit Signs: indicated on drawings. Architect to determine ceiling, end, or wall mount arrangement.

## 2.11 PANELBOARDS

- A. Provide UL-listed safety dead front lighting and power Panelboards where shown on Drawings and as scheduled. Panelboards shall meet or exceed requirements of NEMA Standard Publication PB-1, and UL-50 and 67. Provide cabinets with flush hinges and combination catch and lock. Provide wiring gutters to accommodate large multiple feeder cables and lugs. Except as shown otherwise on Drawings, wiring gutters shall be at least 4 inch for lighting and 208 V panels. Buses shall be copper.
- B. Where two section panels are required, bolt boxes together to form one unit. Trim shall be two-piece construction with doors of equal size over each section.

**ELECTRICAL SYSTEMS**  
**RHODE ISLAND VISITOR CENTER**

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- C. Provide molded case, bolt-on, thermal-magnetic trip, single, two or three pole branch circuit breakers as shown on Drawings. Multiple pole breakers shall be single handle, common-trip.
- D. Main bus work of panels shall carry at least full rating of feeder over current device that supplies panel.
- E. Provide separate neutral ground bus for each panelboard. Neutral bus shall be insulated from panel enclosure. (Provide oversized neutral where indicated).
- F. Provide separate equipment ground bus for each panelboard. Ground bus shall be insulated from panel enclosure.
- G. Power and lighting panels shall have heavy-duty continuous, section vertical-hinged to box section for access to wiring gutters in addition to trim door.
- H. Panelboards shall have integrated short circuit current rating equal to or greater than circuit breaker AIC ratings schedule on Drawings.
- I. Panels shall be by Square D, Type NQOB for 225 A and below, and I-line distribution for 400 A and above, no substitution.
- J. Provide surface metal tubs ready for painting mount panels on 5/8" outdoor plywood.
- K. Provide bus connections for future over current device with suitable insulation and bracing to maintain proper short circuit rating and voltage clearances, where required on Drawings. Provide for ready insertion of future breaker.
- L. Provide typed panel directories, secured to inside of panel doors, that show use of each circuit and electrical characteristics of panelboard.
- M. Provide seismic attachments to panelboards to comply with International Building Code (2003).2.12 FIRE ALARM SYSTEM



- A. Refer to Section 15300 for Addressable Fire Alarm system
- 2.12 DISCONNECT EXISTING ELECTRIC LIGHTING SYTEM AS REQUIRED.
- A. Install complete all equipment disconnects including wiring furnished by others.
- 2.13 DISCONNECT AND RECONNECT EXISTING EXHAUST FAN AND AIR HANDLING SYSTEM AS REQUIRED FOR NEW DESIGN.
- 2.14 FURNISH AND INSTALL COMPLETE ALL NEW VIDEO SURRVALLANCE SYSTEM.

### **PART 3 - EXECUTION**

#### **3.01 COMMISSIONING OF EQUIPMENT AND SYSTEMS**

- A. The Architect will check the completed installation either sequentially as different parts are completed, or when the entire installation is complete, at the sole option of the Architect.
- B. Prior to the Architect's checking a part of the installation or the entire installation, this contractor shall submit a letter signed by an officer of this contracting company or an officer of the general contractor stating that:
  - 1. he is an officer of the company,
  - 2. he has personally inspected the installation to be checked,
  - 3. the date of his inspection,
  - 4.the installation is complete and tested and ready to be inspected by the Architect, and that all required test reports have been submitted.
- C. This contractor shall arrange that an officer of this contracting company or of the general contractor, as well as the Clerk of the Works, in addition to other test witnesses that may be specified, shall witness the below listed tests. At the conclusion of each such test this contractor shall submit a letter signed by the officer stating that:
  - 1. he is an officer of the company,
  - 2. he has personally witnessed the test (give the name of the test),
  - 3. the date of testing,
  - 4. the results of testing, as compared to specified performance,
  - 5. listing the name, title, and company affiliation of all those witnessing the test.
- D. Tests Requiring Letters
  - 1. Electrical:
    - a. Fire alarm System
    - b. System power loads. Submit to Engineer plan to measure and record building power load (amps on all main conducts). Plan must contain operation of all

building load at full draw (amps) including but not limited to lights, a/c, equipment, etc. Test to be witnessed by Engineer. Provide 48 hour notice in writing to Engineer and obtain approval of test before making measurements.

### 3.02 SPECIAL RESPONSIBILITIES

- A. Coordination: Coordinate work of this Section with work of other Sections.
  - 1. Perform work so that progress of project, including work of other Sections, is not delayed.
  - 2. Provide information about items furnished under this Section to be installed under other Sections, as necessary.
  - 3. Obtain detailed information from manufacturers of equipment provided under this Section as to proper methods of installation.
  - 4. Obtain final roughing dimensions and other information as needed for complete installation of items furnished under other Sections or by Owner.
  - 5. Keep fully informed of shape, size and position of openings required for material and equipment provided under this and other Sections. ensure that openings required for work of this Section are coordinated with work of other Sections. Provide cutting and patching as necessary.
  - 6. Coordinate installation and pay backcharges to local electric and telephone companies and city building and fire department.
  - 7. Coordinate sizes, number and locations of concrete housekeeping pads for floor-mounted vibrating and rotating equipment with work of Division 3.
  
- B. Maintenance of equipment and systems: Maintain Electrical equipment and systems until final acceptance by Architect and Owner, and ensure adequate protection of equipment and material during delivery, storage, installation and shutdown conditions. Responsibility shall include provisions required to meet conditions incidental to delays pending final test of systems and equipment under seasonal conditions.
  
- C. Use of premises: Use of premises shall be restricted as directed by Architect and as required below.
  - 1. As required, during progress of work, remove and properly dispose of resultant dirt and debris, and keep premises reasonably clean. When work is complete, remove equipment and unused material and do cleaning and washing required, to provide acceptable appearance and operation of equipment to satisfaction of Architect.
  - 2. It shall be this trade's responsibility to store his materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.
  - 3. Do not interfere with function of existing sewers and water and gas mains. Prevent debris from entering conduit. Confer with Architect as to disruption of electric services or other utilities because of testing or connection of new work to existing.

- D. Inspection by Architect: Periodic inspections by Architect or designated agent shall not be construed as supervision of actual construction, nor make either responsible for providing safe place for performance of work of various trades or suppliers, or for visitors or occupants, or make either responsible for omission of safety devices called for by codes, ordinances, or specifications of equipment manufacturer.
- E. Surveys and measurements:
1. Base horizontal and vertical measurements on reference points established by Contractor and be responsible for correct laying out of work.
  2. In event of discrepancy between actual measurements and those indicated, notify Architect in writing and do not proceed with work until written instructions have been issued by Architect.
- F. Fireproofing:
1. Install clips, hangers, clamps, supports and other attachments to surfaces to be fireproofed before start of spray fiber work.
  2. Work that interferes with proper application of fireproofing shall be installed after completion of spray fiber work.
  3. Patching and repairing of spray fireproofing due to cutting or damaging to fireproofing during course of work of this Section shall be performed by installer of fireproofing and paid for under this Section.
- G. Temporary Utilities: Refer to requirements of Division 1 regarding temporary facilities.
- H. Unload electrical materials and equipment delivered to site. Pay costs for rigging, hoisting, lowering and moving electrical equipment on-site, in building or on roof.
- I. Refer to NEC requirements for mounting heights of switches and circuit breakers. Do not exceed 6-1/2 ft. above finished floor or platform.
- J. Mount groups of electrical equipment or devices in same area (that is, switches, receptacles, clocks and other devices) on common centerlines aligned horizontally and vertically.
- K. Architect's reflected ceiling plans that show lighting fixture locations shall take precedence over lighting plans on Electrical Drawings.
- L. Install complete Vehicle Exhaust System including but not limited to EF-6, control panel, etc.
- M. Install complete all Other Contractor furnished disconnects to their respective systems. This work is all wiring and conduit from power supply to equipment for a complete operating system.
- N. Furnish and install all wire and conduit for operation of room 140 ceiling Fans

(CF-1) from main power supply to wall switches on wall outside of room 130 to each fan.

- O. Furnish and install all necessary wire, conduit etc necessary to provide Code compliant bonding system of all building steel and building foundation steel.
- P. EF-4: Furnish and install complete wiring system (wire, conduit, etc.) for complete system to run EF-4. This system is a wall switch timer to EF-4 and to 2 overhead door operators.
- Q. Install complete Emergency Generator annunciator panel adjacent to FACP in room 102.

### 3.03 MATERIALS AND WORKMANSHIP

- A. Work shall be rectilinear and shall run perpendicular or parallel to general construction. Wiring shall be run concealed unless specified otherwise. Exposed conduit shall run flush to structure, parallel or perpendicular to walls. Install material and equipment according to manufacturer's recommended best practice so that complete installation operates safely and efficiently.
- B. Except as specified otherwise, material or equipment specified and shown on Drawings shall be new and shall meet requirements of latest standards of NEMA, UL, IPCEA, ANSI and IEEE. Equipment shall have components required or recommended by OSHA and applicable NFPA documents and shall be UL-approved where applicable.
- C. Despite references in Specifications or on Drawings to material or piece of equipment by name, make or catalog number, such reference shall be interpreted as establishing standards of quality for materials and performance.
- D. Finish of materials, components and equipment shall not be less than industry good practice. When material or equipment is visible or subject to corrosive or atmospheric conditions, finish shall be as approved by Architect.
- E. Owner will not be responsible for material and equipment before testing and acceptance.

### 3.04 TESTING, INSPECTION AND CLEANING

- A. Test and inspect work provided under this Section as required by Contract Documents, codes, standards and authorities that have jurisdiction, to satisfaction of the Authority's site personnel. Notify Architect and authorities at least 48 hours before testing or inspection. Do not cover work before testing or inspection.

- B. Employ the services of an independent Authority - approval testing company to perform specialized testing and to provide written certification for acceptance of specialized equipment and/or systems.
- C. Furnish Architect with certificates of testing and inspection for electrical systems, indicating approval of authorities that have jurisdiction and conformance with requirements of Contract Documents.
- D. Test wiring and connections for continuity and grounds before fixtures are connected; demonstrate insulation resistance by Megger test as required. Insulation resistance between conductors and grounds for secondary distributions systems shall meet NEC requirements.
- E. Verify and correct as necessary: voltages, tap settings, trip settings and phasing on equipment from secondary distribution system to points of use. Test secondary voltages at bus in main switchboard, at panelboards, and at other locations on distribution systems as necessary. Test secondary voltages under no-load and full-load conditions.
- F. Test lighting fixtures with specified lamps in place for 10 hours; check fixtures in sections. Do not operate lamps other than for testing before final inspection by Architect. Replace lamps that fail within 90 days after acceptance by Architect within Contract Price.
- G. Provide necessary testing equipment and testing.
- H. Failure or defects in workmanship or materials revealed by tests or inspection shall be corrected promptly and retested. Replace defective material.
- I. After completion of project, clean the exterior surface of equipment included in this section, including concrete residue.

### 3.05 NAMEPLATES

- A. Provide nameplates in or on switchboards, panelboards, junction boxes and cabinets, and for special purpose switches, motor disconnect switches, remote control stations, starters or other controls furnished or installed under this Section. Nameplates shall designate equipment controlled and function.
- B. Nameplates shall be laminated black surface for equipment up to 600 volts; blue surface for 5kv; and red surface for 5 kvs white core, bakelite with minimum 1/4 inch high white recessed letters. Nameplates shall be securely attached to the equipment with two Phillips head brass screws or machine bolts with locknuts. Adhesives or cements shall not be used.
- C. Nameplates shall be a minimum of 3 inches long by 1-1/2 inches wide.

### 3.06 ACCESS PANELS

- A. Provide proper access to material or equipment that require inspection, replacement, repair or service and coordinate their delivery with the installing Trade. If proper access cannot be provided, confer with Architect as to best method of approach to minimize effects of reduced access that may result.
- B. Coordinate and prepare a location, size, and function schedule of access panels required to fully service equipment and deliver to a representative of the installing Trade. Furnish and install distinctively colored buttons (color as selected by Architect) in finished ceiling to identify all access panels.
- C. Support cable rack systems separately, above mechanical piping, to ensure accessibility.
- D. Ceilings consisting of lay-in or removable splined tiles do not require access panels and dampers, splitters, or test hole openings above ceiling shall have location marked with thumb tack on finished ceiling panel. Location shall be noted on record drawings.
- E. Access panels shall have same fire rating classification as surface penetrated.
- F. Panels shall be at least 12 in. x 12 in. access panels at equipment shall be 18" x 18".

### 3.07 WIRING METHODS

- A. Install wire and cable in approved raceways as specified and as approved by authorities that have jurisdiction. Surface metal raceways shall not be used unless explicitly specified and shown on Drawings. Do not use surface raceways on floor.
- B. Wire from point of service connection to receptacles, lighting fixtures, devices, equipment, outlets for future extension, and other electrical apparatus as shown on Drawings. Provide slack wire for connections. Tape ends of wires and provide blank covers for outlet boxes designated for future use. Do not install electrical outlets back to back on opposing sides of partitions.
- C. Conductors #10 and smaller in branch circuit panelboards, signal cabinets, signal control boards, switchboards and motor control centers shall be bundled. Conductors larger than #10 in switchboards, motor control centers and pull boxes shall be cabled in individual circuits.
- D. Two or more conduits installed instead of single conduit shall contain duplicate conductors, including neutrals and ground conductors where required; total capacity of duplicate conductors shall be at least equal to capacity of conductors replaced.

- E. Follow homerun circuit numbers shown on Drawings to connect circuits to panelboards. Where homerun circuit numbers are not shown on Drawings, divide similar types of connected loads among phase buses so that currents are approximately equal in normal usage. Connect each branch circuit homerun with two or more circuits and common neutral to circuit breaker or switch in three-wire or four wire branch circuit panelboard so that no two circuits are fed from same bus. Where panelboard cabinets are recessed, provide conduits with sufficient capacity for future conductors for spare branch circuit protective devices and spaces in panelboard; stub up concealed to junction box. Provide extensions above ceiling.
- F. Electrical metallic tubing may be used only in suspended ceiling and dry wall construction.
- G. Install connectors and couplings as recommended by manufacturers. Compression fittings shall not be used with rigid steel, intermediate metallic or aluminum conduit.
- H. Conduit in concrete shall be rigid steel or PVC, minimum Schedule 40. EMT shall not be installed underground, in slabs on grade, in wet locations, in hazardous areas, or for circuits operating at more than 600 V. Buried metallic conduit shall be rigid steel. Run conduit in slabs above bottom steel reinforcing, below top reinforcing and inside beam stirrup, wall reinforcements and column ties.
- I. Rigid non-metallic conduit as specified in Part 2 of this Section may be used, if approved by local authorities, for installation in concrete slabs when installed as required by NEC and manufacturer's requirements. Penetrations from concrete slabs shall be made with rigid steel conduit and rigid steel conduit fittings only.
- J. Maximum outside diameters of raceways in conduit shall be  $\frac{1}{3}$  slab thickness. No more than two  $\frac{3}{4}$  inch raceways shall cross in floor slab at any point. Submit raceway crossing locations for approval before pouring slabs and relocate at no expense to Owner as directed by Architect. Lateral spacing of parallel raceways shall be at least 6 inches on centers. Do not run conduit in slab less than 3 inches thick without express approval and direction of Architect.
- K. Raceways with outside diameters larger than  $\frac{1}{3}$  slab thickness shall be run concealed in hung ceilings in finished areas, exposed in unfinished Mechanical/Electrical and storage areas, or below slabs on grade.
- L. Penetrate waterproof walls of structural slabs and foundation walls only where approved by Architect. Submit proposed penetrations points, size openings and penetration methods to Architect for approval.
- M. Provide flexible conduits for connections to electrical equipment and to equipment furnished under Division 14 and 15 that are subject to movement, vibration or

misalignment; where available space dictates; and where noise transmission must be eliminated or reduced. Flexible conduit shall be liquid tight under following conditions;

1. Exterior locations
2. Moisture or humidity laden atmospheres
3. Corrosive atmospheres
4. Where wash-down operations are possible
5. Where seepage or dripping of oil, grease or water is possible.

- N. Run concealed conduit and EMT in as direct lines as possible with minimum number of bends of longest possible radius. Run exposed conduit and EMT parallel to or at right angles to building lines. Ends shall be free from dents or flattening.
- O. Unless specified or shown on Drawings otherwise, install conduit and EMT concealed. Unless specified or shown otherwise, conduit and EMT may be run exposed on unfinished walls and unfurred basement ceilings and in unfinished penthouses, attics and roof spaces. Provide stand-off clips for conduits on exterior masonry walls.
- P. Install conduit systems complete before drawing in conductors. Blow through and swab after plaster is finished and dry, and before conductors are installed.
- Q. Expansion/Deflection Fittings: Conduit buried or secured rigidly on opposite sides of building expansion joints, seismic joints, and long runs of exposed conduit subject to stress shall have expansion fittings. Fittings shall safely deflect and expand to twice distance of structural movement.
1. Provide separate external copper bonding jumper secured with grounding straps on each end of furring.
  2. Conduits buried in concrete shall cross building expansion joints at right angles; provide expansion fittings as required by manufacturer's instructions. Provide insulated bushings at ends of conduits.
- R. Attach pull ropes to conductors with basket-weave grips on pulling eyes. Pull cables that share conduit at same time.
- S. Provide inserts, hangers, anchors and steel supports as necessary.
- T. Provide pull boxes, sized per Code for job conditions as necessary.

### 3.08 INSTALLATION OF LIGHT FIXTURES

- A. Coordinate installation of fixtures with installation of ceiling materials and suspension systems.



- B. Do not install fixtures until work of other trades that may damage fixtures is completed.
- C. Investigate lighting fixture locations and supports to ensure that no interference exists with hangers, ducts, sprinklers, pipes and other equipment.
- D. Provide plaster frames for fixtures recessed in gypsum board or plaster ceiling.
- E. Do not suspend or support lighting fixtures or safety chains from hung ceiling conduit or duct. Support fixtures with threaded rod from structural members only.
- F. Provide unistrut below ducts where fixture locations coincide with duct runs. Provide threaded rods to support unistrut.
- G. Where air is supplied or returned through luminaries, coordinate compatibility of fixtures with air boots and attachments.
- H. Patch spray-on fireproofing damaged during installation.
- I. Support surface-mounted luminaries at least two concealed points to prevent rotation.
- J. Fire-rated enclosures necessary for fixture housings above ceiling will be provided under another Section.
- K. Mounting height of suspended or wall-mounted luminaries shall be shown on Drawings.
- L. Locate ceiling mounted fixtures as shown on reflected ceiling plans. Locate wall and floor mounted fixtures as shown on Electrical Drawings.
- M. Coordinate aiming of adjustable fixtures with Architect.

### **3.09 UNDERGROUND CONDUITS**

- A. Steel conduits in ground or on vapor barrier shall be field coated with asphaltum or shall have additional outside factory coating of polyvinyl chloride or phenolic resin epoxy material or other equally flexible and chemical resistant material. Couplings and damaged areas of coated conduits shall be field coated with same compound as conduits. Joints shall be threaded.
- B. Joints in conduits and fittings shall be watertight and shall meet requirements of manufacturer's installation recommendations. Threaded portions of steel conduits not encased in concrete, and adjoining ends of conduits, couplings and fittings, shall be coated with asphaltum after installation. Connections between conduits of different types shall be made in approved manner, using adapters and other materials and methods recommended by conduit manufacturers.

- C. Where nonmetallic underground conduit enters building and continues inside to pull box, cabinet, or other electric apparatus, portion through floor or wall and within building shall be steel. Provide adapter below floor or outside wall to connect plastic and metal conduit.
- D. Where underground conduit enters building through membrane waterproofed wall or floor, provide malleable iron seal with gland assembly and adjustable pressure bushings secured to masonry construction with one or more integral flanges. Membrane waterproofing shall be secured to device in watertight manner.
- E. Where underground conduit without concrete envelope enters building through non-waterproofed wall or floor, provide schedule 40 galvanized pipe sleeve. Fill space between conduit and sleeve with suitable plastic expansible compound or oakum and lead joint on each side of wall or floor.
- F. Excavation, shoring, bracing, backfilling and grading will be provided under Division 2. Trenches shall be evenly graded so that conduits slope uniformly at least 3 inches per 100 feet, without horizontal or vertical waves.

### 3.10 SLEEVES

- A. Provide Schedule 40 steel sleeves as required. Fill slots, sleeves and other openings in floors or walls if not used. Fill spaces in openings after installation of conduit or cable.
- B. Fill for floor penetrations shall be fire-resistant, compatible with floor material and finished to prevent passage of water, smoke and fumes. Fill in walls shall be similar to wall material, shall be fire-resistant in fire walls, and shall prevent passage of air, smoke and fumes.
- C. Where conduits passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling and wall finishes.
- D. Identify unused sleeves and slots for future installation.
- E. Lay out conduit and openings in advance, to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.
- F. Sleeves for conduits that penetrate outside walls, basement slabs, footings and beams shall be water-proof. Extend sleeves in toilet and apparatus rooms floors 2 inches above finished floor.

**3.11 MOTORS, CONNECTIONS AND CONTROLS**

- A. Motors will be furnished under other Sections. Starters, except those in motor control centers, will be furnished under other Sections and shall be installed under this Section.
- B. Provide and wire motor disconnect switches except as specified or indicated on Drawings.
- C. Motors 1/2 hp and larger shall be as scheduled; motors less than 1/2 hp shall be 120 V, single phase, 60 Hz, unless shown otherwise on Drawings.
- D. Mount motor starters not in motor control centers on new 3/4 inch exterior grade plywood mounting board finished to match starter enclosures. Mount boards 60 inches above finished floor on solid walls or columns in spaces not normally occupied. Obtain approval of starter locations from Architect.
- E. Check electrical connections and sizing of motor circuit protection and prevent damage to motors and equipment from incorrect direction of rotation.
- F. Consult Drawings and Specifications and shop drawings for verifications of size, speed and operation for motors furnished under this Section and other Sections.
- G. Final connection to motors shall be made with flexible conduit (at least 16 in. long) with green ground wire installed.

**3.12 GROUNDING**

- A. Provide equipment grounding system as shown on Drawings. Equipment grounding system shall be designed so metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items in close proximity with electrical circuits operate continuously at ground potential and provide low impedance path for possible ground fault currents.
- B. System shall meet NEC requirements, modified as shown on Drawings and as specified.
- C. Provide separate green insulated equipment grounding conductor for each single or three phase feeder and each branch circuit. Install grounding conductor in common conduit with related phase or neutral conductors, or both. Parallel feeders installed in more than one raceway shall have individual full size green insulated equipment ground conductors.
- D. Determine number and sizes of screw terminals for equipment grounding bars in panelboards and other electrical equipment. Provide screw terminals for active circuits, spares and spaces.

- E. Provide green insulated grounding conductor in nonmetallic conduits or ducts unless specified otherwise.
- F. Ground and bond per State Code building steel to electric grounding system.

### 3.13 INSTALLATION OF EQUIPMENT

- A. Avoid interferences with structure and with work of other Sections. Preserve adequate headroom and clear doors and passageways, to satisfaction of Architect and as required by codes. Installation shall permit clearance for access to equipment for repair, servicing and replacement.
- B. Install equipment to distribute equipment loads properly on building structural members provided for equipment support under other Sections. Roof mounted equipment shall be installed and supported on structural steel provided under other Sections.
- C. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall or ceiling mounting of equipment provided under this Section as shown on Drawings and as specified.
- D. Provide steel supports and hardware for proper installation of hangers, anchors, guides, and other devices.
- E. Provide catalog cuts, weights, and other pertinent data required for proper coordination of equipment support provisions and installation.
- F. Structural steel and hardware shall meet ASTM Standard Specifications requirements. Use of steel and hardware shall meet requirements of Code of Practice of American Institute of Steel Construction.
- G. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly that nullifies warrantee. Report in writing to Architect, before purchase or shipment of equipment involved, on conditions that may prevent proper installation.
- H. Repair damage to galvanized coatings with approved aluminum paint.
- I. Where shown on Drawings provide outlet boxes in walls (size on legend) for all data, telephone, TV and communication wiring (wiring by others, outlet boxes, emt conduit from boxes to above ceiling terminating with a 90 degree elbow and two pull strings by this Contractor).
- J. Install all material and equipment of this section to all requirements of the seismic requirements of the International Building Code (2003). Provide all

necessary equipment, labor and material to comply with these requirements.

- K. All lighting controls to be fully compatible with the State of Rhode Island VIVE standards. Refer and follow Drawings and State VIVE requirements.

3.14 FURNISH , INSTALL AND COMMISSION ALL NEW RIDOT VIDEO SURVEILLANCE SYSTEM

- A. Furnish and install a completely new Video Surveillance for both indoor and outdoor equipment using existing wire (Cat6), conduit, and existing emergency power as appropriate with written approval of the Engineer.
- B. Provide all necessary accessories required for a complete system including the following main components
  1. Wireless Video “Head End” System Controller: In Utility Room  
AXIS S2224 01583-004 120 v/ 20 AMP. Plug into receptacle (existing). Powered By Existing Emergency Battery System  
Provide system wire and conduit required by RIDOT per Cox and/or Verizon.  
Provide with 24- port Network PoE Switch TPE-TG240G.
  2. Three New Roof Wireless Transmitters: In same location on building as existing transmitters: New Fluidmesh: Model 3200 -FLMESH-HW-3200-1 With Fluidmesh L-FLMESH-3200-12: On existing Pole by Fluidmesh and Fluidmesh mounting brackets (FM-BRKT) as required by Fluidmesh. Wire only using required wire and/or conduit approved by Fluidmesh per installation instructions manual. With FM3200EEW Limited Warranty Extension FM3200-EEW-5Y.
  3. Pole mounted (refer to Drawings) transceivers on existing poles (per Drawing C1.0) Quantity full responsibility of Contractor.  
Install Wireless transceiver Fluidmesh- HW-VOLO-INA With L-FLMESH- VOLO-5 and 8- port Network PoE model TEG TG84 and Fluidmesh bracket kit (FM-BRKT).
  4. Wire new transceiver to Outdoor Camera with Fluidmesh approved wire (Cat6), and/or conduit.
  5. Provide required cameras and accessories according to Drawing and Drawing tables on C1.0
- C. Indoor Camera: Axis P3265-LVE 02333-001 with new T91E615506-481 wall bracket wire from controller to camera

using Cat6 wire with manufacturer furnished terminals using Fluidmesh requirements according to installation manual. Existing Cat6 wire can only be used with Written permission of Engineer.

- D. Outdoor Camera: Axis P1467-02341-001 Wire to Fluidmesh Receiver. Wire from Pole to Receiver using (Cat6) wire. Fluidmesh required installation manual instructions. Attach Receiver to Pole with new Fluidmesh installation Bracket (T91E). With Model 60-110 MM pole mounting adapter each Device (Quarantine required is the full responsibility of Contractor)
- E. Commissioning: Test and commission entire system according to all RIDOT requirements and Fluidmesh procedures and requirements in accordance with Fluidmesh installation and operations manual(s). Allow 40 hours of instructions by Manufacturer Factory Representative(s) Per approval of Engineer in writing.
- F. Provider of all required equipment, Cat6 wire, cameras, receivers, head end unit,etc for this entire section:  
SHANIX TECHNOLOGY, INC.  
40 WORTHINGTON RD.  
CRANSTON, RI 02920  
C/O MUSTAPHA GHAREE  
401-941-4222 EXT 714

**END OF SECTION**