

PROJECT MANUAL

OLV HUMAN SERVICES

REV-UP! RENOVATION

100 Martin Rd.

Lackawanna, NY 14218

CPL PROJECT NO.: 16128.00

DOCUMENT DATE: 4-19-22

DESIGN PROFESSIONALS CERTIFICATION

The undersigned certifies that, to the best of his or her knowledge, information and belief, that the "Design conforms to all applicable provisions of the current New York State Uniform Fire Prevention Code, Building Code and Energy Conservation Code and that the "Work will involve known or suspected ACBM, and will be done in accordance with Industrial Code Rule #56".

ARCHITECT / ENGINEER:	OWNER:
CPL	OLV Human Services
26 Mississippi St.	790 Ridge Rd.
Buffalo, New York 14203	Lackawanna, NY 14218
716-852-2100	



**SECTION 000110
TABLE OF CONTENTS**

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

- 000110 - Table of Contents
- 000116 - Invitation to Bid
- 002000 - Instructions to Bidders
- 003126 - Existing Hazardous Material Information
- 004010 - Form of Proposal - General Construction
- 005100 - Agreement Form - A101
- 006000 - Project Forms
- 007100 - General Conditions - A201

SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

- 011000 - Summary
- 012000 - Price and Payment Procedures
- 012100 - Allowances
- 012300 - Alternates
- 012500 - Substitution Procedures
- 012519 - Equivalents
- 012600 - Contract Modification Procedures
- 012900 - Payment Procedures
- 013000 - Administrative Requirements
- 013100 - Project Management and Coordination
- 013200 - Construction Progress Documentation
- 013216 - Construction Progress Schedule
- 013300 - Submittal Procedures
- 014000 - Quality Requirements
- 015000 - Temporary Facilities and Controls
- 016000 - Product Requirements
- 017300 - Execution
- 017329 - Cutting and Patching
- 017419 - Construction Waste Management and Disposal
- 017700 - Closeout Procedures
- 017823 - Operation and Maintenance Data
- 017839 - Project Record Documents
- 017900 - Demonstration and Training

DIVISION 02 -- EXISTING CONDITIONS

- 024100 - Demolition

028213 - Asbestos Abatement

DIVISION 03 -- CONCRETE

035400 - Cast Underlayment

DIVISION 04 -- MASONRY (NOT USED)

DIVISION 05 -- METALS

055000 - Metal Fabrications

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

061063 - Miscellaneous Rough Carpentry

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

078400 - Firestopping

079200 - Joint Sealants

DIVISION 08 -- OPENINGS

081113 - Hollow Metal Doors and Frames

081613 - Fiberglass Doors

083100 - Access Doors and Panels

088000 - Glazing

DIVISION 09 -- FINISHES

092116 - Gypsum Board Assemblies

092216 - Non-Structural Metal Framing

093000 - Tiling

095100 - Acoustical Ceilings

096500 - Resilient Flooring

096566 - Resilient Athletic Flooring

096813 - Tile Carpeting

099123 - Interior Painting

DIVISION 10 -- SPECIALTIES

102800 - Toilet, Bath, and Laundry Accessories

DIVISION 11 -- EQUIPMENT (NOT USED)

DIVISION 12 -- FURNISHINGS

123200 - Manufactured Wood Casework

123600 - Countertops

DIVISION 21 -- FIRE SUPPRESSION

210500 - Common Work Results for Fire Suppression

210523 - General-Duty Valves for Water-Based Fire-Suppression Piping

210553 - Identification for Fire Suppression Piping and Equipment

211300 - Fire-Suppression Sprinkler Systems

DIVISION 22 -- PLUMBING

220500 - Common Work Results for Plumbing

220517 - Sleeves and Sleeve Seals for Plumbing Piping

- 220523 - General-Duty Valves for Plumbing Piping
- 220529 - Hangers and Supports for Plumbing Piping and Equipment
- 220553 - Identification for Plumbing Piping and Equipment
- 220719 - Plumbing Piping Insulation
- 221005 - Plumbing Piping
- 221006 - Plumbing Piping Specialties
- 224000 - Plumbing Fixtures

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

- 230000 - General Provisions for Mechanical Work
- 230002 - Mechanical and Electrical Coordination
- 230513 - Common Motor Requirements for HVAC Equipment
- 230517 - Sleeves and Sleeve Seals for HVAC Piping
- 230519 - Meters and Gauges for HVAC Piping
- 230523 - General-Duty Valves for HVAC Piping
- 230529 - Hangers and Supports for HVAC Piping and Equipment
- 230553 - Identification for HVAC Piping and Equipment
- 230593 - Testing, Adjusting, and Balancing for HVAC
- 230713 - Duct Insulation
- 230719 - HVAC Piping Insulation
- 230913 - Instrumentation and Control Devices for HVAC
- 230914 - Flow Instruments
- 230993 - Sequence of Operations for HVAC Controls
- 232113 - Hydronic Piping
- 232114 - Hydronic Specialties
- 233100 - HVAC Ducts and Casings
- 233300 - Air Duct Accessories
- 233700 - Air Outlets and Inlets
- 238216 - Air Coils

DIVISION 26 -- ELECTRICAL

- 26 0010 - General Provisions for Electrical Work
- 260505 - Selective Demolition for Electrical
- 260519 - Low-Voltage Electrical Power Conductors and Cables
- 260526 - Grounding and Bonding for Electrical Systems
- 260529 - Hangers and Supports for Electrical Systems
- 260533.13 - Conduit for Electrical Systems
- 260533.16 - Boxes for Electrical Systems
- 260553 - Identification for Electrical Systems
- 260923 - Lighting Control Devices
- 262416 - Panelboards

262726 - Wiring Devices

262813 - Fuses

262816.13 - Enclosed Circuit Breakers

262816.16 - Enclosed Switches

265100 - Interior Lighting

DIVISION 27 -- COMMUNICATIONS

270000 - Communications Installation Overview

271000 - Structured Cabling

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

284601 - Fire Alarm System (Existing System)

DIVISION 31 -- EARTHWORK

312000 - Earth Moving

312323 - Soil Compaction

DIVISION 32 -- EXTERIOR IMPROVEMENTS

321313 - Concrete Paving

END OF SECTION

**SECTION 001116
INVITATION TO BID**

THE OLV HUMAN SERVICES INVITES BIDS FOR GENERAL CONSTRUCTION WORK FOR REV-UP! RENOVATIONS LOCATED AT 100 MARTIN RD., LACKAWANNA, NY 14218. SEPARATE SEALED BIDS WILL BE RECEIVED BY OLV HUMAN SERVICES AT THE ARCHITECT'S OFFICE LOCATED AT 26 MISSISSIPPI ST., BUFFALO, NEW YORK 14203 UNTIL 2:00 PM, LOCAL TIME ON MAY 10, 2022.

1.1 PROJECT INFORMATION

- A. Notice to Bidders: Pre-Qualified bidders may submit bids for project as described in this Document. Submit bids according to the Instructions to Bidders.
- B. Project Identification: Rev-Up! Renovations
 - 1. Project Location: 100 Martin Rd., Lackawanna, New York 14218
- C. Owner: OLV Human Services - 790 Ridge Rd., Lackawanna, New York 14218
 - 1. Owner's Representative:
 - a. Karen Ralph-Langdon, Chief Facilities and Procurement Officer
- D. Architect: CPL Architects, Engineers, Landscape Architect and Surveyor d/b/a CPL 26 Mississippi Street, Buffalo, NY 14203.
 - 1. Architect's Representative
 - a. Michelle Ezzo
 - b. PH: 716-220-3492
- E. Project Description: Project consists of Renovations to existing building to provide recreation space for OLV clients. Work includes site work, interior renovations, plumbing, mechanical, electrical and fire protection.
 - 1. Project cost range is anticipated to be under \$700,000.
- F. Construction Contract: Bids will be received for the following Work:
 - 1. General Contract (all trades).

1.2 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed lump sum bids until the bid time and date at the location given below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
 - 1. Bid Date: May 10, 2022
 - 2. Bid Time: 2:00 pm local time.
 - 3. Location: Office of CPL
26 Mississippi St.
Buffalo,
- B. Bids will be thereafter privately opened.

1.3 BID SECURITY

- A. Bid security shall be submitted with each bid in the amount of [5%] five percent of the bid amount. No bids may be withdrawn for a period of [45] forty-five days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

1.4 PREBID MEETING

- A. Prebid Meeting: A Prebid meeting for all bidders will be held on Tuesday April 26 at 10:00 am at 100 Martin Rd. Please use the parking lot to the west of the building on Katherine Place. Prospective prime bidders are **requested** to attend.

1.5 DOCUMENTS

- A. Online Procurement and Contract Documents: May be obtained on or after May 10, 2022, by contacting Avalon Document Services - 716-995-7777 , for a non-refundable check of \$15.00 Online access will be provided to **Prime bidders and all registered sub-contractors and vendors only**.
- B. Viewing Procurement and Contract Documents: Examine at the following locations:
 - 1. **Avalon Private Plan Room**

1.6 TIME OF COMPLETION

- A. Successful bidder shall begin the Work upon receipt of the Notice to Proceed and shall complete the Work within the Contract Time **A time period to be determined between the Owner and the awarded contractor.**

1.7 BIDDER'S QUALIFICATIONS

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

1.8 NOTIFICATION

- A. Attention of the Bidder is particularly called to **the Owner's sales tax exemption.**

1.9 AWARD OF BIDS

- A. This Invitation to Bid document is issued by **OLV Human Services.**
- B. The OLV Human Services hereby reserves the right to waive any informalities and reject any, or all, Bids or to accept the one that, in its judgement, will be in the best interest of OLV Human Services

END OF SECTION

**SECTION 002000
INSTRUCTIONS TO BIDDERS COVER**

PART 1 GENERAL

1.1 SUMMARY

- A. Attached is AIA Document A701-2018, Instructions to Bidders.
 - 1. AIA Document A701-2018 defines the conditions affecting award of contract and procedures with which Bidders must comply.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 002000

 **AIA[®] Document A701[™] – 2018****Instructions to Bidders**

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

Rev-Up! Renovations
100 Martin Road
Lackawanna, NY 14218

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

OLV Human Services
790 Ridge Road
Lackawanna, NY 14218

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

CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C.
d/b/a CPL
26 Mississippi Street
Buffalo, NY 14203

TABLE OF ARTICLES

- 1 **DEFINITIONS**
- 2 **BIDDER'S REPRESENTATIONS**
- 3 **BIDDING DOCUMENTS**
- 4 **BIDDING PROCEDURES**
- 5 **CONSIDERATION OF BIDS**
- 6 **POST-BID INFORMATION**
- 7 **PERFORMANCE BOND AND PAYMENT BOND**
- 8 **ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS**

ADDITIONS AND DELETIONS:

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

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

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

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

ARTICLE 1 DEFINITIONS

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

§ 1.2 Definitions set forth in the General and Supplementary (if required) Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

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

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

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

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

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

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

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

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders

(Paragraphs deleted)

may obtain Bidding Documents as designated in the Advertisement or Invitation to Bid, for the deposit sum and method stated therein.

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within thirty (30) days following the award of the Contract or rejection of the Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded. Good condition as used in this

section means that the Bidding Documents must be returned bound as issued, legible, and containing only the markings necessary for bidding purposes.

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

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

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

§ 3.2 Modification or Interpretation of Bidding Documents

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

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing via email and shall be received by the Architect at least seven working days prior to the date for receipt of Bids, or as follows:

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

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner, including phone calls, shall not be binding, and Bidders shall not rely upon them.

§ 3.2.4 In the absence of an interpretation, correction or change, should the Drawings disagree in themselves or with the Specifications, the better quality, the costlier or the greater quantity of work or materials shall be estimated upon, and unless otherwise ordered, shall be furnished.

§ 3.2.5 Communications regarding the Bidding Documents shall be directed to Michelle Ezzo at CPL, 26 Mississippi Street, Buffalo, NY 14203, Telephone.(716) 220-3492.

§ 3.3 Substitutions

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

§ 3.3.2 Substitution Process

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

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

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

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

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

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents. The procedure for review and approval of Substitutions is set forth in the § 3.4.2 of the General and Supplementary (if required) Conditions of the Contract and in the General Requirements (Division 1 of the Specifications).

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents through the print method stated in the Advertisement or Invitation to Bid, or as follows:
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

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

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

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

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

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

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

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

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

(Paragraph deleted)

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security: Bid Security of not less than five percent (5%) of the amount of the Bid, in the form of a Bid Bond or a Certified Check made payable to the Owner.

§ 4.2.2 Except as stated under **§ 4.4.3**, the Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid, with the understanding that the Bid Security shall guarantee that the Bidder will not withdraw its Bid for a period of forty-five (45) days after the scheduled closing time for the receipt of Bids, and that if its Bid is accepted, the Bidder will enter into a formal contract with the Owner in accordance with the terms stated in the Bid and will furnish any required performance and payment bonds at the time required. In the event of the withdrawal of said Bid within the forty-five (45) day period or the failure of the successful Bidder to enter into the Contract with the Owner or the failure of the successful Bidder to furnish required performance and payment bonds at the time required, the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty, which represents the damage the Owner incurred as a result of the Bidder's default.

In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

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

§ 4.2.4 The Bid Securities shall be returned to all Bidders except the three (3) lowest Bidders within three (3) days after the formal opening of bids. The remaining Bid Securities will be returned within forty-eight (48) hours after the Owner and the successful Bidder have executed the Contract and executed performance and payment bonds have been approved by the Owner. If a Contract has not been executed or performance and payment bonds have not been approved by the Owner within forty-five (45) days after the scheduled closing time for the receipt of bids, then Bid Securities will be returned within three (3) days after the expiration of this forty-five (45) day period unless the Bid Security has been forfeited under **§ 4.2.2**.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as a paper Bid, or as indicated below:

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

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

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

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

§ 4.4 Modification or Withdrawal of Bid

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

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

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

§ 4.4.4 Unless a Bid error complies with § 4.4.3, a Bid may not be modified, withdrawn or canceled by the Bidder for a period of forty-five (45) days following the time and date designated for the receipt of Bids, and each Bidder agrees to this requirement in submitting a Bid.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

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

§ 5.2 Rejection of Bids

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

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner, for Public projects, to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

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

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

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

§ 6.2 Owner's Financial Capability

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

§ 6.3 Submittals

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

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

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

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

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

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 The Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

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

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

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall each be equal to one hundred (100) percent of the Contract Sum.

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

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than ten (10) days after the Bidder has received notice of the acceptance of its Bid but in no event shall bonds be delivered later than the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

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

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

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

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.

(Insert the complete AIA Document number, including year, and Document title.)

- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.

(Insert the complete AIA Document number, including year, and Document title.)

- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.

(Insert the complete AIA Document number, including year, and Document title.)

- .4
(Paragraph deleted)

- .5 Drawings-**Refer to Section 000115 – List of Drawings**

Number	Title	Date
--------	-------	------

- .6 Specifications **Refer to Section 000110 – Table of Contents**

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

- .7 Addenda:

Number	Date	Pages
--------	------	-------

- .8 Other Exhibits:

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

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

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

- .9

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

ARTICLE 9: NEWFORMA REQUIREMENTS

9.1 After notification of selection for the award of the Contract, the Bidder shall be required to use the Newforma Info Exchange for the transfer of Submittals, Shop Drawings and RFI's. There will be **no exceptions** to this requirement. The contractor will be given a Login and Password free of charge.

ARTICLE 10: TAXES

10.1 The Owner is an organization, which is exempt from New York State and Local Sales and Use Taxes. Materials purchased for use in fulfilling this Contract will be exempt from New York Sales Tax. The Owner will provide the Contractor with a completed Form ST-119.1, Exempt Organization Certification. The Contractor shall present a copy of this Form and a completed Form ST-120.1, Contractor Exempt Purchase Certificate, to each supplier. Should sales tax be assessed, the Owner agrees that the Contract Sum shall be increased by the full amount of such assessment.

SECTION 003126
EXISTING HAZARDOUS MATERIAL INFORMATION

PART 1 GENERAL

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. This Section with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. An existing asbestos, lead, and PCB (Polychlorinate Biphenyl) report for Project, prepared by AECC Environmental Consultants, dated 12-22-2015, is appended to this Document.
- C. Related Requirements:
 - 1. Section 024119 "Selective Structure Demolition" for notification requirements if materials suspected of containing hazardous materials are encountered.
 - 2. Section 028213 "Asbestos Abatement" for procedures on the handling, removal and disposal of asbestos containing materials

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 003126



LIMITED HAZARDOUS MATERIAL PRE-RENOVATION SURVEY REPORT

Baker Victory Services
Vincent Cottage
150 Martin Road
Lackawanna, New York 14218

Prepared for:

Baker Victory Services
790 Ridge Road
Lackawanna, New York 14218

Prepared by:

Asbestos & Environmental Consulting Corporation (AECC)
1325 Millersport Highway, Suite 210
Amherst, New York 14221



December 22, 2015

Mr. Lee Kellaway
 Facilities Maintenance
 Baker Victory Services
 790 Ridge Road
 Lackawanna, New York 14218

**RE: Limited Hazardous Material Pre-Renovation Survey Report
 Baker Victory Services – Vincent Cottage
 150 Martin Road, Lackawanna, New York 14218
 AECC Project Number: 15-300**

Dear Mr. Kellaway:

The Asbestos & Environmental Consulting Corporation (AECC) performed a limited hazardous material pre-renovation survey at the Baker Victory Services (BVS) Vincent Cottage, located at 150 Martin Road, in Lackawanna, New York. The survey was performed in anticipation of an upcoming capital improvement project. The following tables and summary explain the results:

ASBESTOS PRE-RENOVATION SURVEY

The asbestos bulk samples were collected by Mr. Jeffrey Macklem, a New York State Department of Labor (NYSDOL)-certified Asbestos Building Inspector. The following building materials were collected, labeled, and shipped to AmeriSci New York for laboratory analysis:

Table 1 – Asbestos Bulk Sampling Survey

SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLE LOCATION(S)	ASBESTOS CONTENT
FT-001A,B	12"x12" Floor Tile (Tan w/ Brown Streaks)	Kitchen Room #23 – Top Layer of Flooring	NAD
FTMAS-002A,B	Floor Tile Mastic (Black)	Kitchen Room #23	1.7% Chrysotile
CB-003A,B	6" Cove Base (Black)	Kitchen Room #23	NAD
CBM-004A,B	Cove Base Mastic (Brown)	Kitchen Room #23	NAD

Mr. Lee Kellaway
 Baker Victory Services
Limited Hazardous Material Pre-Renovation Survey Report
Baker Victory Services – Vincent Cottage

Table 1 – Asbestos Bulk Sampling Survey

SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLE LOCATION(S)	ASBESTOS CONTENT
SM-005A,B	Sink Basin Mastic (Gray)	Kitchen Room #23	NAD
FT-006A,B	Floor Tile (Beige)	Kitchen Room #23 – Bottom Layer of Flooring	3.2% Chrysotile
SHR-007A,B	Sheetrock (White)	Dining Room #22	NAD
JC-008A,B	Joint Compound (White)	Dining Room #22	NAD
WPM-009A,B	Wall Panel Mastic (Tan)	Rooms #22 & #23	NAD
FT-010A,B	12"x12" Floor Tile (White w/ Gray Specks)	Dining Room #22	NAD
CPTMAS-011A,B	Carpet Mastic (Yellow)	Living Room #21	TRACE
CB-012A,B	6" Cove Base (Peach)	Living Room #21	NAD
CBM-013A,B	Cove Base Mastic (Tan)	Living Room #21	NAD
CTM-014A,B	Ceramic Wall Tile Mastic (Tan)	Lavatory Room #25	NAD
CTG-015A,B	Ceramic Wall Tile Grout (White)	Lavatory Room #25	NAD
CTM-016A,B	Ceramic Floor Tile Thin Set (Gray)	Lavatory Room #25	NAD
CTG-017A,B	Ceramic Floor Tile Grout (Gray)	Lavatory Room #25	NAD
TSI-018A,B,C	Thermal System Insulation	Boiler Room #26	NAD
MF-019A,B,C	Mudded Fitting Insulation	Boiler Room #26	1.5% Chrysotile
TSI-020A,B,C	Thermal System Insulation (White)	Boiler Room #26	8.3% Chrysotile 25.0% Amosite
BRC-021A,B,C	Breeching Cement (Gray)	Boiler Room #26	0.5% Chrysotile
FT-022A,B	12"x12" Floor Tile (White w/ Blue Streaks)	Bedrooms #19 & #20	TRACE
CB-023A,B	6" Cove Base (Blue)	Bedroom #19	NAD
CBM-024A,B	Cove Base Mastic (White)	Bedroom #19	NAD

Mr. Lee Kellaway
 Baker Victory Services
Limited Hazardous Material Pre-Renovation Survey Report
Baker Victory Services – Vincent Cottage

Table 1 – Asbestos Bulk Sampling Survey

SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLE LOCATION(S)	ASBESTOS CONTENT
ACT-025A,B	1'x1' Ceiling Tile (White)	Storage Room #15	NAD
GD-026A,B	Ceiling Tile Glue Dots (Brown)	Storage Room #15	NAD
DC-027A,B	Door Caulk (White)	Lavatory Rooms #27 & #28	NAD
CTG-028A,B	Ceramic Wall Tile Grout (Pink / White)	Shower Rooms #29 & #13	NAD
CTG-029A,B	Ceramic Floor Tile Grout (Gray)	Shower Rooms #29 & #13	NAD
CPTMAS-030A,B	Carpet Mastic (Yellow / Brown)	Computer Room	NAD
FT-031A,B	12"x12" Floor Tile (Blue)	Gym Closet Room #8	NAD
FTMAS-032A,B	Floor Tile Mastic (Black)	Gym Closet Room #8	1.6% Chrysotile
ACT-033A,B	2'x2' Acoustical Ceiling Tile (White, Fissured Pattern)	Recreation Office Room #30	NAD
CPTMAS-034A,B	Carpet Mastic (Gray)	Recreation Office Room #30	NAD
CB-035A,B	Cove Base (Gray)	Recreation Office Room #30	NAD
CBM-036A,B	Cove Base Mastic (Brown)	Recreation Office Room #30	NAD
WG-037A,B	Window Glazing Compound (White)	Recreation Office Room #30	1.7% Chrysotile
CTG-038A,B	Ceramic Tile Grout (Gray)	Recreation Office Room #30	NAD

Table Notes:

NAD = No Asbestos Detected
 TRACE = Less than 1% Asbestos

The following asbestos-containing materials (ACMs) and presumed asbestos-containing materials (PACMs) were discovered during the asbestos pre-renovation survey:

Table 2 – Approximate Quantity of ACMs & PACMs

BUILDING MATERIAL	MATERIAL LOCATION	ESTIMATED QUANTITY	MATERIAL CONDITION
Black Floor Tile Mastic (FTMAS-002, FTMAS-032)	Throughout Building (Under Any Combination of ACM or Non-ACM Flooring, Carpeting, or Plywood/Lauan)	8,500 SF	NF, Intact

Mr. Lee Kellaway
 Baker Victory Services
Limited Hazardous Material Pre-Renovation Survey Report
Baker Victory Services – Vincent Cottage

Table 2 – Approximate Quantity of ACMs & PACMs

BUILDING MATERIAL	MATERIAL LOCATION	ESTIMATED QUANTITY	MATERIAL CONDITION
Beige Floor Tile (FT-006)	Throughout Building (Either Exposed or Under Any Combination of ACM or Non-ACM Flooring, Carpeting, or Plywood/Lauan)	10,100 SF	NF, Intact
Mudded Fitting Insulation (MF-019)	Throughout Building (Accessible Areas)	415 SF	F, Intact
Thermal System Insulation (TSI-020)			
Window Glazing Compound (WG-037)	Windows	80 SF	NF, Intact
Valve Gaskets (PACM)	Room Between Bedrooms 7 & 8	18 EA	NF, Intact
Electrical Components (PACM)	Boiler Room	6 SF	NA
Boiler Components (PACM)	Boiler Room	NA	NA

Table Notes:

SF = Square Feet
 LF = Linear Feet
 EA = Each
 NF = Non-Friable
 F = Friable
 NA = Not Assessed

Asbestos Bulk Sample Summary – By regulatory definition, a building material must be greater than one percent (1%) asbestos to be considered an ACM. During this survey, black floor tile mastic, beige floor tile, mudded fitting insulation, thermal system insulation, and window glazing compound were determined to be ACMs by laboratory analysis. Boiler components, electrical components, and valve gaskets were designated as PACMs by AECC’s personnel. According to state and federal laws, ACMs and PACMs must be handled and disposed of by a licensed abatement contractor prior to any renovation or demolition-related activities. The laboratory results have been included in Attachment B of this report.

OSHA Compliance – It should be noted that the Occupational Safety & Health Administration (OSHA) Asbestos Standard (29 CFR 1926.1101) has a definition for both "asbestos" and "asbestos-containing material." Under OSHA Asbestos Standard, the definition of asbestos covers all materials containing any concentration of detected asbestos, including those with concentrations less than or equal to one percent asbestos (yellow carpet mastic, gray breaching cement, and the 12” white w/ blue streaks floor tile). Although work operations conducted in areas where a material contains less than or equal to one percent asbestos is an "unclassified" operation, the employer still must follow the

Mr. Lee Kellaway
Baker Victory Services
Limited Hazardous Material Pre-Renovation Survey Report
Baker Victory Services – Vincent Cottage

requirements of 29 CFR 1926.1101(g)(1) [except (g)(1)(i)], (g)(2) and (g)(3) that describe engineering and work practice controls operations to prevent unnecessary asbestos exposures to their employees (worker protection regulations).

Transmittal of Building / Structure Asbestos Survey Information – As required by New York State Industrial Code Rule 56, one copy of the results of the building/structure asbestos survey shall be immediately transmitted by the building/structure owner as follows:

1. One (1) copy of the completed asbestos survey shall be sent by the owner or their agent to the local entity charged with issuing a permit for such demolition, renovation, remodeling or repair work under State or local laws.
2. One (1) copy of the completed asbestos survey shall be kept on the construction site with the asbestos notification and variance, if required, throughout the duration of the asbestos project and any associated demolition, renovation, remodeling or repair project.

CAULK SAMPLING FOR PCBs

The following representative caulk applications were sampled, labeled, and shipped to Schneider Laboratories Global, Inc. for polychlorinated biphenyls (PCB) analysis:

Table 3 – PCB Bulk Sampling Summary

SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLE LOCATION	PCB CONTENT
DC-027P	Door Caulk (White)	Bathroom 27	BQL

Table Notes:

BQL = Below Quantification Limit

PCB Bulk Sample Summary – By regulatory definition, bulk samples are considered PCB-containing at 50 parts per million (ppm). The door caulk application collected during this sampling event is not a PCB-containing bulk material, as determined by laboratory analysis. The sample results of the PCB bulk sample testing have been included in Attachment C of this report.

LEAD-BASED PAINT INSPECTION

AECC's subcontractor, EcoSpect, Inc. (EcoSpect), performed a limited lead-based paint (LBP) inspection of the interior of the building. During the course of the inspection, LBP was identified in a metal ladder and the glazed block window sills. Please reference EcoSpect's *Lead-Based Paint XRF Testing Report* (dated December 20, 2015) for

Mr. Lee Kellaway
 Baker Victory Services
Limited Hazardous Material Pre-Renovation Survey Report
Baker Victory Services – Vincent Cottage

additional details pertaining to the investigation techniques, sampling methodologies, and results of the LBP inspection (Attachment D).

MISCELLANEOUS HAZARDOUS / SPECIAL WASTE INVENTORY

The following items were observed during AECC investigation and presumed to contain the specified hazardous / special wastes in the table below:

Table 4 – Miscellaneous Hazardous / Special Wastes

MISCELLANEOUS ITEM	ITEM LOCATION	ESTIMATED COUNT	PRESUMED WASTE	ITEM CONDITION
In-Service Fluorescent Light Bulbs	Throughout Building	110	Mercury & Lead	Intact
In-Service Light Ballasts	Throughout Building	55	PCBs	Intact
Exit Signs (Fluorescent Bulbs and Lead Batteries)	Throughout Building	8	Mercury & Lead	Intact
Thermostats	Throughout	3	Mercury	Intact
Stored Various Cleaners, Solvents, Paints, Etc.	Throughout	32	Volatile Organic Compounds	Intact
Emergency Flood Lights	Throughout	3	Lead	Intact

Miscellaneous Hazardous / Special Wastes Summary – Additional investigation into the status of these materials may be performed to prove that hazardous materials are not present. However, without conducting this additional investigation, these materials must be presumed to contain potentially hazardous materials and handled/disposed of in accordance with state and federal regulations.

Project Limitations – As per discussions with the Client, the following tasks were not performed during this survey:

- Roofing investigation and/or sampling
- Fire door investigation and/or sampling
- Investigation into inaccessible areas (i.e. wall chases, wall cavities, inside boilers)
- Investigation into block walls for insulation / vermiculite
- Invasive / destructive floor, wall, or ceiling coring

Report Note – In the event that other building materials (materials not specifically identified in this report) are identified during the course of the project, the materials shall be treated as potentially hazardous materials until examined by a qualified environmental professional and laboratory analysis proves otherwise.

Mr. Lee Kellaway
Baker Victory Services
Limited Hazardous Material Pre-Renovation Survey Report
Baker Victory Services – Vincent Cottage

If you have any questions pertaining to this report, please contact me directly at (716) 204-8377.

Sincerely,
Asbestos & Environmental Consulting Corporation



Jeffrey Macklem
Project Manager



Bryan Bowers
President / Owner

Attachment A: AECC Company License and Personnel Certifications
Attachment B: Asbestos Bulk Sample Laboratory Results
Attachment C: PCB Bulk Sample Laboratory Results
Attachment D: EcoSpect Inc. Lead-Based Paint XRF Testing Report
Attachment E: Figure 1

ATTACHMENT A

AECC COMPANY LICENSE AND PERSONNEL CERTIFICATIONS

New York State – Department of Labor

Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

Asbestos & Environmental Consulting Corporation
6308 Fly Road
E. Syracuse, NY 13057

FILE NUMBER: 09-42909
LICENSE NUMBER: 42909
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 02/12/2015
EXPIRATION DATE: 02/29/2016

Duly Authorized Representative – Bryan Bowers:

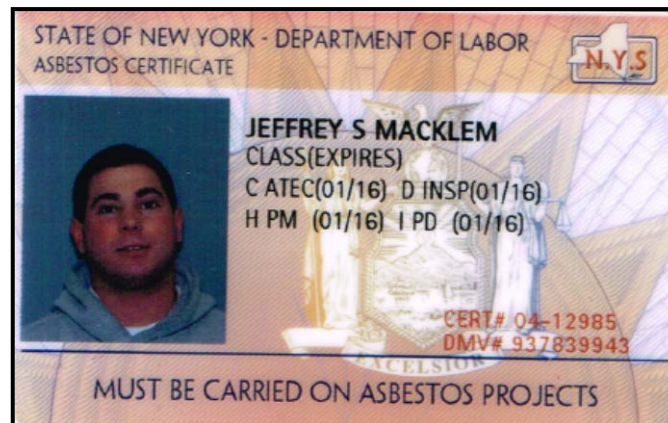
This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director
For the Commissioner of Labor

ASBESTOS CERTIFICATION



The following letter codes (as shown on the handling certificate) represent the corresponding asbestos classifications.

A – Asbestos Handler

B – Allied Trades

C – Air sampling Technician

D – Asbestos Inspector

E – Management Planner

F – Operations & Maintenance

G – Asbestos Supervisor

H – Asbestos Project Monitor

I – Asbestos Project Designer

ATTACHMENT B

ASBESTOS BULK SAMPLE LABORATORY RESULTS

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	FT-001A	001	0.437	20.4	70.7	8.9	NAD	NAD
	Location: Kitchen - Rm. #23 - 12 x 12 Fl. Tile - Tan W/ Brown Streaks (Top Layer)							
02	FT-001B	001	0.407	19.4	72.0	8.6	NAD	NAD
	Location: Kitchen - Rm. #23 - 12 x 12 Fl. Tile - Tan W/ Brown Streaks (Top Layer)							
03	FTMAS-002A	002	0.111	82.0	13.5	4.5	Chrysotile <0.25	NA
	Location: Kitchen - Rm. #23 - Black Fl. Tile Mastic							
04	FTMAS-002B	002	0.082	46.3	46.3	5.6	Chrysotile 1.7	NA
	Location: Kitchen - Rm. #23 - Black Fl. Tile Mastic							
05	CB-003A	003	0.180	40.0	58.9	1.1	NAD	NAD
	Location: Kitchen - Rm. #23 - Black 6" Cove Base							
06	CB-003B	003	0.211	43.1	56.4	0.5	NAD	NAD
	Location: Kitchen - Rm. #23 - Black 6" Cove Base							
07	CBM-004A	004	0.086	59.3	8.1	32.6	NAD	NAD
	Location: Kitchen - Rm. #23 - Brown Cove Base Mastic							
08	CBM-004B	004	0.191	45.5	19.9	34.6	NAD	NAD
	Location: Kitchen - Rm. #23 - Brown Cove Base Mastic							
09	SM-005A	005	0.106	34.0	27.4	38.7	NAD	NAD
	Location: Kitchen - Rm. #23 - Gray Sink Mastic							
10	SM-005B	005	0.090	28.9	43.3	27.8	NAD	NAD
	Location: Kitchen - Rm. #23 - Gray Sink Mastic							
11	FT-006A	006	0.420	17.6	68.1	11.1	Chrysotile 3.2	NA
	Location: Kitchen - Rm. #23 - Beige Fl. Tile (Bottom Layer)							
12	FT-006B	006	0.462	18.6	73.2	8.2	NA/PS	NA
	Location: Kitchen - Rm. #23 - Beige Fl. Tile (Bottom Layer)							
13	SHR-007A	007	---	---	---	---	NAD	NA
	Location: Dining Rm. #21 - Sheetrock							
14	SHR-007B	007	---	---	---	---	NAD	NA
	Location: Dining Rm. #21 - Sheetrock							
15	JC-008A	008	---	---	---	---	NAD	NA
	Location: Dining Rm. #21 - Joint Compound							
16	JC-008B	008	---	---	---	---	NAD	NA
	Location: Dining Rm. #21 - Joint Compound							

See Reporting notes on last page

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	WPM-009A	009	0.137	32.1	43.8	24.1	NAD	NAD
Location: #21, #23 - Tan Wall Panel Mastic								
18	WPM-009B	009	0.131	30.5	45.0	24.4	NAD	NAD
Location: #21, #23 - Tan Wall Panel Mastic								
19	FT-010A	010	0.391	20.5	72.1	7.4	NAD	NAD
Location: Rm. #21 - 12 x 12 White Fl. Tile W/ Gray Dots								
20	FT-010B	010	0.412	19.9	74.8	5.3	NAD	NAD
Location: Rm. #21 - 12 x 12 White Fl. Tile W/ Gray Dots								
21	CPTMAS-011A	011	0.244	48.8	16.8	34.3	Chrysotile <0.25	Chrysotile Trace
Location: Living Rm. - Rm. #21 - Yellow Carpet Mastic								
22	CPTMAS-011B	011	0.224	48.7	17.4	33.8	Chrysotile <0.25	Chrysotile Trace
Location: Living Rm. - Rm. #21 - Yellow Carpet Mastic								
23	CB-012A	012	0.143	35.7	62.9	1.4	NAD	NAD
Location: Living Rm. - Rm. #21 - Peach 6" Cove Base								
24	CB-012B	012	0.308	38.3	59.1	2.6	NAD	NAD
Location: Living Rm. - Rm. #21 - Peach 6" Cove Base								
25	CBM-013A	013	0.156	65.4	10.3	24.4	NAD	NAD
Location: Living Rm. - Rm. #21 - Tan Cove Base Mastic								
26	CBM-013B	013	0.142	59.2	14.1	26.8	NAD	NAD
Location: Living Rm. - Rm. #21 - Tan Cove Base Mastic								
27	CTM-014A	014	0.106	42.5	12.3	45.3	NAD	NAD
Location: Lav. - Rm. #25 - Tan Ceramic Wall Tile Mastic								
28	CTM-014B	014	0.156	44.2	3.8	51.9	NAD	NAD
Location: Lav. - Rm. #25 - Tan Ceramic Wall Tile Mastic								
29	CTG-015A	015	----	----	----	----	NAD	NA
Location: Lav. - Rm. #25 - White Ceramic Wall Tile Grout								
30	CTG-015B	015	----	----	----	----	NAD	NA
Location: Lav. - Rm. #25 - White Ceramic Wall Tile Grout								
31	CTM-016A	016	----	----	----	----	NAD	NA
Location: Lav. - Rm. #25 - Ceramic Tile Thinset Gray (Floor)								
32	CTM-016B	016	----	----	----	----	NAD	NA
Location: Lav. - Rm. #25 - Ceramic Tile Thinset Gray (Floor)								

See Reporting notes on last page

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	CTG-017A	017	----	----	----	----	NAD	NA
	Location: Lav. - Rm. #25 - Ceramic Fl. Tile Grout - Gray							
34	CTG-017B	017	----	----	----	----	NAD	NA
	Location: Lav. - Rm. #25 - Ceramic Fl. Tile Grout - Gray							
35	TSI-018A	018	0.126	73.8	2.4	23.8	NAD	NAD
	Location: Boiler Rm. - Rm. #26 - Thermal Sys. Insulation							
36	TSI-018B	018	0.215	71.2	6.0	22.8	NAD	NAD
	Location: Boiler Rm. - Rm. #26 - Thermal Sys. Insulation							
37	TSI-018C	018	0.189	78.8	1.6	19.6	NAD	NAD
	Location: Boiler Rm. - Rm. #26 - Thermal Sys. Insulation							
38	MF-019A	019	----	----	----	----	Chrysotile 1.5	NA
	Location: Boiler Rm. - Rm. #26 - Mudded Fittings (Elbows)							
39	MF-019B	019	----	----	----	----	NA/PS	NA
	Location: Boiler Rm. - Rm. #26 - Mudded Fittings (Elbows)							
40	MF-019C	019	----	----	----	----	NA/PS	NA
	Location: Boiler Rm. - Rm. #26 - Mudded Fittings (Elbows)							
41	TSI-020A	020	----	----	----	----	Chrysotile 8.3 Amosite 25.0	NA
	Location: Boiler Rm. - Rm. #26 - White Thermal Sys. Ins.							
42	TSI-020B	020	----	----	----	----	NA/PS	NA
	Location: Boiler Rm. - Rm. #26 - White Thermal Sys. Ins.							
43	TSI-020C	020	----	----	----	----	NA/PS	NA
	Location: Boiler Rm. - Rm. #26 - White Thermal Sys. Ins.							
44	BRC-021A	021	----	----	----	----	Chrysotile <0.25	NA
	Location: Boiler Rm. - Rm. #26 - Gray Breaching Cement							
45	BRC-021B	021	----	----	----	----	NAD	NA
	Location: Boiler Rm. - Rm. #26 - Gray Breaching Cement							
46	BRC-021C	021	----	----	----	----	Chrysotile 0.5	NA
	Location: Boiler Rm. - Rm. #26 - Gray Breaching Cement							
47	FT-022A	022	0.267	15.7	52.8	31.4	NAD	Chrysotile Trace
	Location: Bedrooms - Rm. #19 & #20 - 12 x 12 White W/ Blue Streaks Fl. Tile							
48	FT-022B	022	0.275	16.4	55.3	28.4	NAD	NAD
	Location: Bedrooms - Rm. #19 & #20 - 12 x 12 White W/ Blue Streaks Fl. Tile							

See Reporting notes on last page

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49	CB-023A	023	0.180	38.3	55.6	6.1	NAD	NAD
	Location: Bedroom - Rm. #19 - 6" Blue Cove Base							
50	CB-023B	023	0.348	37.6	60.9	1.4	NAD	NAD
	Location: Bedroom - Rm. #19 - 6" Blue Cove Base							
51	CBM-024A	024	0.110	42.7	32.7	24.5	NAD	NAD
	Location: Bedroom - Rm. #19 - White Cove Base Mastic							
52	CBM-024B	024	0.115	41.7	37.4	20.9	NAD	NAD
	Location: Bedroom - Rm. #19 - White Cove Base Mastic							
53	ACT-025A	025	0.283	65.7	6.4	27.9	NAD	NAD
	Location: Storage Rm. - Rm. #15 - 1 x 1 Ceiling Tile							
54	ACT-025B	025	0.303	67.0	10.2	22.8	NAD	NAD
	Location: Storage Rm. - Rm. #15 - 1 x 1 Ceiling Tile							
55	GD-026A	026	0.178	53.4	5.6	41.0	NAD	NAD
	Location: Storage Rm. - Rm. #15 - Brown Glue Dots							
56	GD-026B	026	0.259	54.1	10.0	35.9	NAD	NAD
	Location: Storage Rm. - Rm. #15 - Brown Glue Dots							
57	DC-027A	027	0.189	29.1	65.1	5.8	NAD	NAD
	Location: Lavs. - Rms. #27, #28 - White Door Caulk							
58	DC-027B	027	0.231	24.7	71.9	3.5	NAD	NAD
	Location: Lavs. - Rms. #27, #28 - White Door Caulk							
59	CTG-028A	028	----	----	----	----	NAD	NA
	Location: Shower Rms. #29 & #13 - Pink & White Ceramic Wall Tile Grout							
60	CTG-028B	028	----	----	----	----	NAD	NA
	Location: Shower Rms. #29 & #13 - Pink & White Ceramic Wall Tile Grout							
61	CTG-029A	029	----	----	----	----	NAD	NA
	Location: Shower Rms. #29 & #13 - Gray Ceramic Fl. Tile Grout							
62	CTG-029B	029	----	----	----	----	NAD	NA
	Location: Shower Rms. #29 & #13 - Gray Ceramic Fl. Tile Grout							
63	CPTMAS-030A	030	0.146	63.7	6.8	29.5	NAD	NAD
	Location: Computer Room - Yellow / Brown Carpet Mastic							
64	CPTMAS-030B	030	0.220	68.2	0.5	31.4	NAD	NAD
	Location: Computer Room - Yellow / Brown Carpet Mastic							

See Reporting notes on last page

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
65	FT-031A	031	0.493	17.2	79.9	2.8	NAD	NAD
Location: Gym Closet - Rm. #8 - 12 x 12 Blue Fl. Tile								
66	FT-031B	031	0.308	17.9	78.9	3.2	NAD	NAD
Location: Gym Closet - Rm. #8 - 12 x 12 Blue Fl. Tile								
67	FTMAS-032A	032	0.082	32.9	54.9	12.2	Chrysotile <0.25	NA
Location: Gym Closet - Rm. #8 - Black Fl. Tile Mastic								
68	FTMAS-032B	032	0.108	35.2	50.0	13.2	Chrysotile 1.6	NA
Location: Gym Closet - Rm. #8 - Black Fl. Tile Mastic								
69	ACT-033A	033	0.271	21.4	28.8	49.8	NAD	NAD
Location: Rec. Office - Rm. #30 - 2 x 2 Fissured Ceiling Tile								
70	ACT-033B	033	0.211	23.7	27.0	49.3	NAD	NAD
Location: Rec. Office - Rm. #30 - 2 x 2 Fissured Ceiling Tile								
71	CPTMAS-034A	034	0.071	42.3	32.4	25.4	NAD	NAD
Location: Rec. Office - Rm. #30 - Gray Carpet Mastic								
72	CPTMAS-034B	034	0.072	54.2	29.2	16.7	NAD	NAD
Location: Rec. Office - Rm. #30 - Gray Carpet Mastic								
73	CB-035A	035	0.234	41.5	53.8	4.7	NAD	NAD
Location: Rec. Office - Rm. #30 - Gray Cove Base								
74	CB-035B	035	0.220	55.0	41.4	3.6	NAD	NAD
Location: Rec. Office - Rm. #30 - Gray Cove Base								
75	CBM-036A	036	0.161	47.8	14.9	37.3	NAD	NAD
Location: Rec. Office - Rm. #30 - Brown Cove Base Mastic								
76	CBM-036B	036	0.253	49.8	2.8	47.4	NAD	NAD
Location: Rec. Office - Rm. #30 - Brown Cove Base Mastic								

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
-------------------	----------------	---------	----------------------	--------------------------	--------------------------	------------------------------------	-------------------------	----------------------

Analyzed by: Marik Peysakhov ; Date Analyzed 11/6/2015

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by EPA 600/M4-82-020 per 40 CFR or ELAP 198.1 for New York friable samples or ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (not covered by NVLAP Bulk accreditation) or ELAP 198.4; for New York samples; NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses); NVLAP 200546-0, NYSDOH ELAP Lab 11480, AIHA Lab 102843.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

Reviewed By: _____



AmeriSci New York

117 EAST 30TH ST.
NEW YORK, NY 10016

TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Asbestos & Environmental Consulting C **Date Received** 11/03/15 **AmeriSci Job #** 215111186
Attn: Bryan Bowers **Date Examined** 11/06/15 **P.O. #**
6308 Fly Road **ELAP #** 11480 **Page** 1 of 14
RE: 15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent Cottage
East Syracuse, NY 13057

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-001A 001	215111186-01 Location: Kitchen - Rm. #23 - 12 x 12 Fl. Tile - Tan W/ Brown Streaks (Top Layer)	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Brown/Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 8.9 %			
FT-001B 001	215111186-02 Location: Kitchen - Rm. #23 - 12 x 12 Fl. Tile - Tan W/ Brown Streaks (Top Layer)	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Brown/Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 8.6 %			
FTMAS-002A 002	215111186-03 Location: Kitchen - Rm. #23 - Black Fl. Tile Mastic	Yes	Trace (<0.25 % pc) ¹ (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <0.25 % pc Other Material: Non-fibrous 4.5 %			
FTMAS-002B 002	215111186-04 Location: Kitchen - Rm. #23 - Black Fl. Tile Mastic	Yes	1.7 % (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 1.7 % Other Material: Non-fibrous 5.6 %			
CB-003A 003	215111186-05 Location: Kitchen - Rm. #23 - Black 6" Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 1.1 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CB-003B 003	21511186-06 Location: Kitchen - Rm. #23 - Black 6" Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 0.5 %			
CBM-004A 004	21511186-07 Location: Kitchen - Rm. #23 - Brown Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 32.6 %			
CBM-004B 004	21511186-08 Location: Kitchen - Rm. #23 - Brown Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 34.6 %			
SM-005A 005	21511186-09 Location: Kitchen - Rm. #23 - Gray Sink Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 38.7 %			
SM-005B 005	21511186-10 Location: Kitchen - Rm. #23 - Gray Sink Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 27.8 %			
FT-006A 006	21511186-11 Location: Kitchen - Rm. #23 - Beige Fl. Tile (Bottom Layer)	Yes	3.2 % (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan/Beige, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 3.2 % Other Material: Non-fibrous 11.1 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-006B 006	215111186-12 Location: Kitchen - Rm. #23 - Beige Fl. Tile (Bottom Layer)		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
SHR-007A 007	215111186-13 Location: Dining Rm. #21 - Sheetrock	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: OffWhite, Homogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2 %, Non-fibrous 98 %			
SHR-007B 007	215111186-14 Location: Dining Rm. #21 - Sheetrock	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: OffWhite/Yellow, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 1 %, Fibrous glass 1 %, Non-fibrous 98 %			
JC-008A 008	215111186-15 Location: Dining Rm. #21 - Joint Compound	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
JC-008B 008	215111186-16 Location: Dining Rm. #21 - Joint Compound	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100 %			
WPM-009A 009	215111186-17 Location: #21, #23 - Tan Wall Panel Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 24.1 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WPM-009B 009	215111186-18 Location: #21, #23 - Tan Wall Panel Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 24.4 %			
FT-010A 010	215111186-19 Location: Rm. #21 - 12 x 12 White Fl. Tile W/ Gray Dots	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Light Grey, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 7.4 %			
FT-010B 010	215111186-20 Location: Rm. #21 - 12 x 12 White Fl. Tile W/ Gray Dots	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Light Grey, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 5.3 %			
CPTMAS-011A 011	215111186-21 Location: Living Rm. - Rm. #21 - Yellow Carpet Mastic	Yes	Trace (<0.25 % pc) ¹ (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Yellow/Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <0.25 % pc Other Material: Non-fibrous 34.4 %			
CPTMAS-011B 011	215111186-22 Location: Living Rm. - Rm. #21 - Yellow Carpet Mastic	Yes	Trace (<0.25 % pc) ¹ (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Yellow/Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <0.25 % pc Other Material: Non-fibrous 33.9 %			
CB-012A 012	215111186-23 Location: Living Rm. - Rm. #21 - Peach 6" Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Peach, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 1.4 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CB-012B 012	21511186-24 Location: Living Rm. - Rm. #21 - Peach 6" Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Peach, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 2.6 %			
CBM-013A 013	21511186-25 Location: Living Rm. - Rm. #21 - Tan Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 24.4 %			
CBM-013B 013	21511186-26 Location: Living Rm. - Rm. #21 - Tan Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 26.8 %			
CTM-014A 014	21511186-27 Location: Lav. - Rm. #25 - Tan Ceramic Wall Tile Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 45.3 %			
CTM-014B 014	21511186-28 Location: Lav. - Rm. #25 - Tan Ceramic Wall Tile Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Yellow, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 51.9 %			
CTG-015A 015	21511186-29 Location: Lav. - Rm. #25 - White Ceramic Wall Tile Grout	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Cream, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CTG-015B 015	21511186-30 Location: Lav. - Rm. #25 - White Ceramic Wall Tile Grout	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Cream, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100 %			
CTM-016A 016	21511186-31 Location: Lav. - Rm. #25 - Ceramic Tile Thinset Gray (Floor)	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100 %			
CTM-016B 016	21511186-32 Location: Lav. - Rm. #25 - Ceramic Tile Thinset Gray (Floor)	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100 %			
CTG-017A 017	21511186-33 Location: Lav. - Rm. #25 - Ceramic Fl. Tile Grout - Gray	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100 %			
CTG-017B 017	21511186-34 Location: Lav. - Rm. #25 - Ceramic Fl. Tile Grout - Gray	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100 %			
TSI-018A 018	21511186-35 Location: Boiler Rm. - Rm. #26 - Thermal Sys. Insulation	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Silver/Black/Yellow, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Fibrous glass 3 %, Non-fibrous 20.8 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
TSI-018B 018	215111186-36 Location: Boiler Rm. - Rm. #26 - Thermal Sys. Insulation	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Silver/Black/Yellow, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Fibrous glass 2 %, Non-fibrous 20.8 %			
TSI-018C 018	215111186-37 Location: Boiler Rm. - Rm. #26 - Thermal Sys. Insulation	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Silver/Black/Yellow, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Fibrous glass 5 %, Non-fibrous 14.6 %			
MF-019A 019	215111186-38 Location: Boiler Rm. - Rm. #26 - Mudded Fittings (Elbows)	Yes	1.5 % (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material			
Asbestos Types: Chrysotile 1.5 %			
Other Material: Cellulose Trace, Fibrous glass 45 %, Non-fibrous 53.5 %			
MF-019B 019	215111186-39 Location: Boiler Rm. - Rm. #26 - Mudded Fittings (Elbows)		NA/PS
Analyst Description: Bulk Material			
Asbestos Types:			
Other Material:			
MF-019C 019	215111186-40 Location: Boiler Rm. - Rm. #26 - Mudded Fittings (Elbows)		NA/PS
Analyst Description: Bulk Material			
Asbestos Types:			
Other Material:			
TSI-020A 020	215111186-41 Location: Boiler Rm. - Rm. #26 - White Thermal Sys. Ins.	Yes	33.3 % (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: OffWhite, Homogeneous, Fibrous, Bulk Material			
Asbestos Types: Chrysotile 8.3 %, Amosite 25.0 %			
Other Material: Non-fibrous 66.7 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
TSI-020B 020	21511186-42 Location: Boiler Rm. - Rm. #26 - White Thermal Sys. Ins.		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
TSI-020C 020	21511186-43 Location: Boiler Rm. - Rm. #26 - White Thermal Sys. Ins.		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
BRC-021A 021	21511186-44 Location: Boiler Rm. - Rm. #26 - Gray Breaching Cement	Yes	Trace (<0.25 % pc) (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Chrysotile <0.25 % pc Other Material: Cellulose Trace, Non-fibrous 100 %			
BRC-021B 021	21511186-45 Location: Boiler Rm. - Rm. #26 - Gray Breaching Cement	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100 %			
BRC-021C 021	21511186-46 Location: Boiler Rm. - Rm. #26 - Gray Breaching Cement	Yes	0.5 % (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Chrysotile 0.5 % Other Material: Cellulose Trace, Non-fibrous 99.5 %			
FT-022A 022	21511186-47 Location: Bedrooms - Rm. #19 & #20 - 12 x 12 White W/ Blue Streaks Fl. Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 31.5 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-022B 022	215111186-48 Location: Bedrooms - Rm. #19 & #20 - 12 x 12 White W/ Blue Streaks Fl. Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 28.4 %			
CB-023A 023	215111186-49 Location: Bedroom - Rm. #19 - 6" Blue Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Blue, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 6.1 %			
CB-023B 023	215111186-50 Location: Bedroom - Rm. #19 - 6" Blue Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Blue, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 1.4 %			
CBM-024A 024	215111186-51 Location: Bedroom - Rm. #19 - White Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 24.5 %			
CBM-024B 024	215111186-52 Location: Bedroom - Rm. #19 - White Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 20.9 %			
ACT-025A 025	215111186-53 Location: Storage Rm. - Rm. #15 - 1 x 1 Ceiling Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: White/Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 27.9 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
ACT-025B 025	215111186-54 Location: Storage Rm. - Rm. #15 - 1 x 1 Ceiling Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: White/Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 22.8 %			
GD-026A 026	215111186-55 Location: Storage Rm. - Rm. #15 - Brown Glue Dots	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 41 %			
GD-026B 026	215111186-56 Location: Storage Rm. - Rm. #15 - Brown Glue Dots	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 35.9 %			
DC-027A 027	215111186-57 Location: Lavs. - Rms. #27, #28 - White Door Caulk	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 5.8 %			
DC-027B 027	215111186-58 Location: Lavs. - Rms. #27, #28 - White Door Caulk	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 3.5 %			
CTG-028A 028	215111186-59 Location: Shower Rms. #29 & #13 - Pink & White Ceramic Wall Tile Grout	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Pink, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CTG-028B 028	21511186-60 Location: Shower Rms. #29 & #13 - Pink & White Ceramic Wall Tile Grout	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Pink, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100 %			
CTG-029A 029	21511186-61 Location: Shower Rms. #29 & #13 - Gray Ceramic Fl. Tile Grout	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose Trace, Non-fibrous 100 %			
CTG-029B 029	21511186-62 Location: Shower Rms. #29 & #13 - Gray Ceramic Fl. Tile Grout	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100 %			
CPTMAS-030A 030	21511186-63 Location: Computer Room - Yellow / Brown Carpet Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Yellow/Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 29.5 %			
CPTMAS-030B 030	21511186-64 Location: Computer Room - Yellow / Brown Carpet Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Yellow/Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 31.4 %			
FT-031A 031	21511186-65 Location: Gym Closet - Rm. #8 - 12 x 12 Blue Fl. Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Blue, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 2.8 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-031B 031	215111186-66 Location: Gym Closet - Rm. #8 - 12 x 12 Blue Fl. Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Blue, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 3.2 %			
FTMAS-032A 032	215111186-67 Location: Gym Closet - Rm. #8 - Black Fl. Tile Mastic	Yes	Trace (<0.25 % pc) ¹ (EPA 400 PC) by Valeriu Voicu on 11/06/15
Analyst Description: Black/Tan, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile <0.25 % pc			
Other Material: Fibrous Talc 2 %, Non-fibrous 10.2 %			
FTMAS-032B 032	215111186-68 Location: Gym Closet - Rm. #8 - Black Fl. Tile Mastic	Yes	1.6 % (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Black/Tan, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 1.6 %			
Other Material: Fibrous Talc 3 %, Non-fibrous 10.2 %			
ACT-033A 033	215111186-69 Location: Rec. Office - Rm. #30 - 2 x 2 Fissured Ceiling Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 49.8 %			
ACT-033B 033	215111186-70 Location: Rec. Office - Rm. #30 - 2 x 2 Fissured Ceiling Tile	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 49.3 %			
CPTMAS-034A 034	215111186-71 Location: Rec. Office - Rm. #30 - Gray Carpet Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan/Grey, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 25.4 %			

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CPTMAS-034B 034	215111186-72 Location: Rec. Office - Rm. #30 - Gray Carpet Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Tan/Grey, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 16.7 %			
CB-035A 035	215111186-73 Location: Rec. Office - Rm. #30 - Gray Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 4.7 %			
CB-035B 035	215111186-74 Location: Rec. Office - Rm. #30 - Gray Cove Base	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 3.6 %			
CBM-036A 036	215111186-75 Location: Rec. Office - Rm. #30 - Brown Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 37.3 %			
CBM-036B 036	215111186-76 Location: Rec. Office - Rm. #30 - Brown Cove Base Mastic	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 11/06/15
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 47.4 %			


Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report

15-300; BVS; 125 Martin Rd., Lackawanna, NY, Vincent
Cottage

Reporting Notes:

(1) Sample prepared for analysis by ELAP 198.6 method

Analyzed by: Valeriu Voicu 

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite or 198.6 for NOB samples or EPA 400 pt ct by EPA 600/M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. AIHA-LAP, LLC Lab ID 102843, RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054.

Reviewed By: _____ END OF REPORT _____

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY

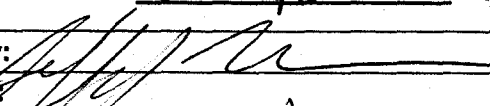
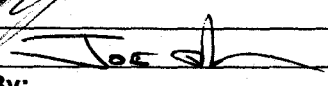
Project Number 15-300
 Client BVS
 Address 125 Martin Rd
Lackawanna, NY
Vincent Cottage

AECC Contact Name: Jeff Macklem
 Office Number: 716-204-8377
 Fax Number: 716-204-8378
 Email: Jeff@aeccgroup.com

SAMPLE ID	LOCATION	DESCRIPTION	REPORT RESULTS AS
FT-001A,B	Kitchen - Rm #23	12 x 12 fl. tile ^{Tan w/ Brown streaks}	(Top layer) % Asbestos
FTMAS-002A,B		Black fl. tile mastic	% Asbestos
CB-003A,B		Black 6" Cove Base	% Asbestos
CBM-004A,B		Broken Cove Base Mastic	% Asbestos
SM-005A,B		Gray Sink Mastic	% Asbestos
FT-006A,B		Beige fl. tile (Bottom layer)	% Asbestos
SHR-007A,B	Dining Rm #21	Sheet Rock	% Asbestos
JC-008A,B	" " "	Joint Compound	% Asbestos
WPM-009A,B	#21 + #23	Tan Wall Panel Mastic	% Asbestos
FT-010A,B	Rm #21	12 x 12 white fl. tile ^{w/ Gray dots}	% Asbestos
CPTMAS-011A,B	Living Rm - Rm #21	Yellow Carpet Mastic	% Asbestos
CB-012A,B		Peach 6" Cove Base	% Asbestos
CBM-013A,B		Tan Cove Base Mastic	% Asbestos
CTM-014A,B	Lav - Rm #25	Tan Ceramic wall tile mastic	% Asbestos
CTG-015A,B		White Ceramic wall tile Grout	% Asbestos
CTM-016A,B		Ceramic tile ^{thin set} grout (Floor) ^{Gray}	% Asbestos
CTG-017A,B		Ceramic fl. tile grout-Gray	% Asbestos
TSI-018A,B,C	Boiler Rm - Rm #26	Thermal Sys. Insulation	% Asbestos

- Analyzing Sequence:
- 1 - Separate layers/mastics for individual analysis, if applicable.
 - 2 - Determine method of analysis for PLM (198.1 or 198.6).
 - 3 - If the PLM NOB result is equal to or greater than 1% asbestos, testing of material is complete. If the PLM NOB result is less than 1% asbestos, please analyze utilizing TEM.
 - 4 - If submitted in series (A, B, C), please stop at first positive
 - 5 - Report Results via e-mail

Sample Turnaround Time: 5 Days Email Verbal To: Jeff@aeccgroup.com Phone: _____

Sampled By: 	Date: <u>11/2/15</u>	Time: _____
Shipped By: _____	Date: _____	
Received By Lab: 	Date: <u>11/3/15</u>	<u>1127</u>
Results e-mailed By: _____	Date: _____	

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY

Project Number 15-300
 Client BVS
 Address 125 Martin Rd
Lackawanna, NY
Vincent Cottage

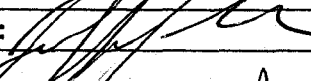
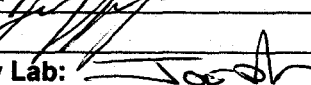
AECC Contact Name: Jeff Macklem
 Office Number: 716-204-8377
 Fax Number: 716-204-8378
 Email: Jeff@aeccgroup.com

SAMPLE ID	LOCATION	DESCRIPTION	REPORT RESULTS AS
MF-019A,B,C	Boiler Rm - Rm #26	mudded fittings (Elbows)	% Asbestos
TSE-020A,B,C	" " " "	White Thermal sys Ins	% Asbestos
BRC-021A,B,C	" " " "	Gray Breachng Cement	% Asbestos
FT-022A,B	Bedrooms - Rm #19+#20	12x12 white w/ blue streaks Fl. tile	% Asbestos
CB-023A,B	Bedroom - Rm #19	6" Blue Cove Base	% Asbestos
CBM-024A,B	" " "	White Cove Base Mastic	% Asbestos
ACT-025A,B	Storage Rm - Rm #15	1x1 Ceiling Tile	% Asbestos
GD-026A,B	" " " "	Brown Glue Dots	% Asbestos
DC-027A,B	Levs - Rms #27, #28	White Door Caulk	% Asbestos
CTG-028A,B	Shower Rms - #29+#13	White/Ceramic wall tile grout	% Asbestos
CTG-029A,B	" " " "	Gray Ceramic fl. tile grout	% Asbestos
CPTMAS-030A,B	Computer Room	Yellow/Brown Carpet mastic	% Asbestos
FT-031A,B	Gym Closet - Rm #8	12x12 Blue Fl. tile	% Asbestos
FTMAS-032A,B	" " " "	Black fl. tile mastic	% Asbestos
ACT-033A,B	Rec. office - Rm #30	2x2 fissured Ceiling tile	% Asbestos
CPTMAS-034A,B		Gray Carpet mastic	% Asbestos
CB-035A,B		Gray Cove Base	% Asbestos
CBM-036A,B		Brown Cove Base mastic	% Asbestos

Analyzing Sequence:

- 1 - Separate layers/mastics for individual analysis, if applicable.
- 2 - Determine method of analysis for PLM (198.1 or 198.6).
- 3 - If the PLM NOB result is equal to or greater than 1% asbestos, testing of material is complete. If the PLM NOB result is less than 1% asbestos, please analyze utilizing TEM.
- 4 - If submitted in series (A, B, C), please stop at first positive
- 5 - Report Results via e-mail

Sample Turnaround Time: 5 Day Email Verbal To: Jeff@aeccgroup.com Phone: _____

Sampled By: 	Date: <u>11/2/15</u>	Time: _____
Shipped By: 	Date: _____	
Received By Lab: <u>Joe</u>	Date: <u>11/3/15 1127</u>	
Results e-mailed By: _____	Date: _____	

Client Name: Asbestos & Environmental Consulting Corp.

Table I
Summary of Bulk Asbestos Analysis Results
 15.300; BUS; 150 Martin Rd., Lackawanna, NY - Mount Cottage

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	WG-037A	037	0.190	14.7	79.5	4.1	Chrysotile <1	Chrysotile 1.7
Location: Rec. Room - White Window Glaze Compound								
02	WG-037B	037	0.117	23.1	72.6	4.3	Chrysotile <1	NA/PS
Location: Rec. Room - White Window Glaze Compound								
03	CTG-038A	038	---	---	---	---	NAD	NA
Location: Rec. Room - Gray Ceramic Tile Grout								
04	CTG-038B	038	---	---	---	---	NAD	NA
Location: Rec. Room - Gray Ceramic Tile Grout								

Analyzed by: Marik Peysakhov ; Date Analyzed 11/18/2015

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by EPA 600/M4-82-020 per 40 CFR or ELAP 198.1 for New York friable samples or ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (not covered by NVLAP Bulk accreditation) or ELAP 198.4; for New York samples; NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses); NVLAP 200546-0, NYSDOH ELAP Lab 11480, AIHA Lab 102843.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

Reviewed By: _____



AmeriSci New York

117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Asbestos & Environmental Consulting C
Attn: Bryan Bowers
6308 Fly Road

East Syracuse, NY 13057

Date Received 11/13/15 **AmeriSci Job #** 215112440
Date Examined 11/18/15 **P.O. #**
ELAP # 11480 **Page** 1 of 2
RE: 15.300; BUS; 150 Martin Rd., Lackawanna, NY - Mount
Cottage

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WG-037A 037 Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1 % pc Other Material: Non-fibrous 5.7 %	215112440-01 Location: Rec. Room - White Window Glaze Compound	Yes	Trace (<1 %) (by NYS ELAP 198.6) by David W. Roderick on 11/18/15
WG-037B 037 Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1 % pc Other Material: Non-fibrous 4.2 %	215112440-02 Location: Rec. Room - White Window Glaze Compound	Yes	Trace (<1 %) (by NYS ELAP 198.6) by David W. Roderick on 11/18/15
CTG-038A 038 Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %	215112440-03 Location: Rec. Room - Gray Ceramic Tile Grout	No	NAD (by NYS ELAP 198.1) by David W. Roderick on 11/18/15
CTG-038B 038 Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %	215112440-04 Location: Rec. Room - Gray Ceramic Tile Grout	No	NAD (by NYS ELAP 198.1) by David W. Roderick on 11/18/15

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report

15.300; BUS; 150 Martin Rd., Lackawanna, NY - Mount
Cottage

Reporting Notes:

Analyzed by: David W. Roderick 

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite or 198.6 for NOB samples or EPA 400 pt ct by EPA 600/M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. AIHA-LAP, LLC Lab ID 102843, RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054.

Reviewed By: _____ END OF REPORT _____



#215112440

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY

Project Number 15-300
 Client Bvs
 Address 150 Martin Rd
Lehannona, NY
Vincent Cottage

AECC Contact Name: Jeff Macklem
 Office Number: 716-204-8377
 Fax Number: 716-204-8378
 Email: Jeff@aeccgroup.com

SAMPLE ID	LOCATION	DESCRIPTION	REPORT RESULTS AS
WG-037A,B	Rec. Rm	White Window Glaze	% Asbestos
CTG-038A,B	Gray Ceramic tile Grout	% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos
			% Asbestos

- Analyzing Sequence:
- 1 - Separate layers/mastics for individual analysis, if applicable.
 - 2 - Determine method of analysis for PLM (198.1 or 198.6).
 - 3 - If the PLM NOB result is equal to or greater than 1% asbestos, testing of material is complete. If the PLM NOB result is less than 1% asbestos, please analyze utilizing TEM.
 - 4 - If submitted in series (A, B, C), please stop at first positive
 - 5 - Report Results via e-mail

Sample Turnaround Time: 5 Day Verbal To: Jeff@aeccgroup.com ^{Email} Phone: _____

Sampled By: <u>[Signature]</u>	Date: <u>11/12/15</u>	Time: _____
Shipped By: <u>[Signature]</u>	Date: _____	
Received By Lab: <u>[Signature]</u>	Date: <u>11/13/15</u>	<u>1104</u>
Results e-mailed By: _____	Date: _____	

ATTACHMENT C
PCB BULK SAMPLE LABORATORY RESULTS



Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Asbestos & Environmental Consulting Corp. (4307)
Address: 6308 Fly Road
East Syracuse, NY 13057

Order #: 149191

Matrix Bulk
Received 11/03/15
Reported 11/10/15

Attn:
Project: 150 Martin Rd
Location: Vincent Cottage
Number: 15-300

PO Number:

Table with columns: Sample ID, Cust. Sample ID, Location, Parameter, Method, Result, RL*, Units, Analysis Date, Analyst. Includes data for 149191-001 and various Aroclor compounds.

149191-11/10/15 05:46 PM

Handwritten signature of Irma Faszewski

Reviewed By: Irma Faszewski
QC Director

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. PPM = mg/kg | PPB = µg/kg. The test results reported relate only to the samples submitted.



Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Asbestos & Environmental Consulting Corp. (4307)
Address: 6308 Fly Road
East Syracuse, NY 13057

Order #: 149191

Matrix Bulk
Received 11/03/15
Reported 11/10/15

Attn:
Project: 150 Martin Rd
Location: Vincent Cottage
Number: 15-300

PO Number:

Table with 8 columns: Sample ID, Cust. Sample ID, Location, Method, Result, RL*, Units, Analysis Date, Analyst

Certifications

Table with 6 columns: Parameter, Method, Matrix, CT, NY, VA. Lists certifications for Aroclor samples 1016 through 1268.

Key

Table with 3 columns: State, Regulatory Agency - Lab ID, Certificate Number. Lists CT, NY, and VA.

'X' indicates that the analyte is accredited.
If your state is not listed above, call laboratory for accreditation/certification information.

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. PPM = mg/kg | PPB = µg/kg. The test results reported relate only to the samples submitted.



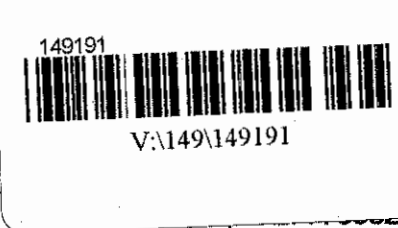
PCB IN BULK SAMPLE CHAIN OF CUSTODY

Project Number 15-300
 Client BVS
 Address 150 Martin Rd
Lackawanna, NY
Vincent Cottage

AECC Contact Name: Bryan Bowers
 Office Number: 585-325-7686
 Fax Number: 585-325-7066
 Email: labdata@aeccgroup.com

Jeff@aeccgroup.com

SAMPLE ID	LOCATION	DESCRIPTION	ANALYSIS REQUIRED
DC-027P	Lays-Rms #27+#28	White Door Caulk	EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			PCB
			PCB
			PCB
			PCB
			PCB
			PCB
			EPA 8082'S PCB
			EPA 8082'S PCB
			EPA 8082'S PCB



Reporting Information: e-mail - (labdata@aeccgroup.com) (Jeff@aeccgroup.com)

Sample Turnaround Time: 5 Days Email Verbal To: ↑ Phone: _____

Sampled By: <u>[Signature]</u>	Date: <u>11/2/15</u>	Time: _____
Shipped By: <u>[Signature]</u>	Date: _____	
Received By Lab: <u>[Signature]</u>	Date: <u>11-3-15</u>	
Results e-mailed By: _____	Date: _____	

ups 2912 +

ATTACHMENT D

ECOSPECT INC. LEAD-BASED PAINT XRF TESTING REPORT



EcoSpect, Inc.

LEAD BASED PAINT SPECIALISTS

Working for a Cleaner & Healthier Environment

Lead-Based Paint XRF Testing Report

Prepared for

Asbestos & Environmental Consulting Corp.
6308 Fly Rd
East Syracuse, NY 13057

Project

Baker Victory Services
Vincent Cottage
Lackawanna, NY 14218

Conducted by

EcoSpect, Inc
5760 Route 96
Romulus, NY

December 20, 2015



EcoSpect, Inc.

LEAD BASED PAINT SPECIALISTS

Working for a Cleaner & Healthier Environment

December 20, 2015

Asbestos & Environmental Consulting Corporation
6308 Fly Rd
East Syracuse, NY 13057

Re: Baker Victory Services
Vincent Cottage
XRF Results

Dear Mr. Jeffrey Macklem:

On November 30, 2015, EcoSpect, Inc. conducted representative testing for the presence of lead based paint, as directed by Asbestos & Environmental Consulting Corporation, at the above captioned location.

The instruments were operated with the guidance from the Performance Characteristics Sheets published by the US Department of HUD and the results classified as positive or negative based the HUD action level of 1.00 mg/cm². Results less than 1.00 mg/cm² are considered negative and results greater than 1.00 mg/cm² are considered positive. For renovation purposes, as well as OSHA implications, it should be noted the lead present in levels less than 1.00 mg/cm² could generate dust that exceeds acceptable levels depending on the renovation or demolition being performed. For OSHA purposes, there are no accepted standards other than "zero" for lead content in surfaces that are affected so as to release lead in the form of dust. XRF readings at the lower end of the range (close to zero) are less likely to create toxic situations. XRF readings with negative prefixes correlate to very low lead levels in that particular surface. For conclusive, task oriented results, contractors should follow all applicable OSHA requirements found in regulation 1926.62.

The walls in each space oriented in a clockwise fashion, with wall #1 oriented to the front of the building. Please refer to the building plans for clarification. An "NA" indicates that the room was not accessible during testing, and "NP" indicates that there were no painted surfaces within that space. During the testing procedures, EcoSpect personnel were able to gain access to the designated spaces, and tested all of the selected rooms that were requested.

Project Notes

- N/A

Summary of Positive Findings

Baker Victory Services:

Positive test results for the presence of lead based paint in concentrations equal to or greater than 1.00 mg/cm² are:

Vincent Cottage

STEEL: Ladder (1)

GLAZED BLOCK: Window Sill (2)

If you have any questions regarding this report please feel free to give us a call at any time.

Sincerely Yours,

A handwritten signature in black ink, appearing to read "Daryl Heffron". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Daryl Heffron
NY-R-121052-1
EcoSpect, Inc.

Summary

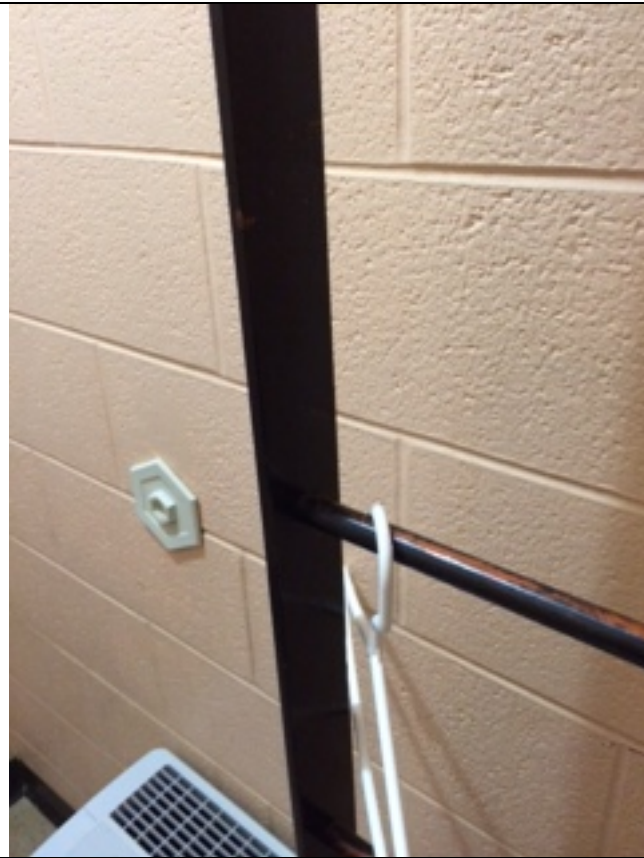
Summary Analysis						
Comp	Component	Number Tested	Number Pos (%)	Number Neg (%)	Lab Tested	Lab Pos (%)
1	Ceiling	25	0 (0%)	25 (100%)	0	0 (0%)
2	Door	37	0 (0%)	37 (100%)	0	0 (0%)
3	Door Jamb	1	0 (0%)	1 (100%)	0	0 (0%)
4	Door Molding	40	0 (0%)	40 (100%)	0	0 (0%)
5	Floor	4	0 (0%)	4 (100%)	0	0 (0%)
6	Ladder	1	1 (100%)	0 (0%)	0	0 (0%)
7	Radiator	18	0 (0%)	18 (100%)	0	0 (0%)
8	Stall	3	0 (0%)	3 (100%)	0	0 (0%)
9	Storm Window	13	0 (0%)	13 (100%)	0	0 (0%)
10	Wall	142	0 (0%)	142 (100%)	0	0 (0%)
11	Window Molding	12	0 (0%)	12 (100%)	0	0 (0%)
12	Window Sill	12	2 (17%)	10 (83%)	0	0 (0%)

Daily Calibrations

#	Time	Type	Duration	Units	Res	EScale1	EsclCT	PbL	PbK
1	11/30/2015 9:37	Calibrations	130.89	cps	384.54	4.14	2.45	0.51	0
4	11/30/2015 9:40	Calibrations	19.85	mg / cm ^2				1	0.13
6	11/30/2015 9:42	Calibrations	19.85	mg / cm ^2				1	-0.07
8	11/30/2015 9:43	Calibrations	16.01	mg / cm ^2				1.1	0.21
353	11/30/2015 12:50	Calibrations	19.84	mg / cm ^2				1	0.4
354	11/30/2015 12:57	Calibrations	120.83	cps	379.21	4.14	2.44	0.51	0.01
355	11/30/2015 12:58	Calibrations	19.87	mg / cm ^2				1	0.23
612	11/30/2015 14:56	Calibrations	7.9	mg / cm ^2				1.1	0.4
1	12/1/2015 9:50	Calibrations	124.84	cps	378.11	4.14	2.46	0.47	0
2	12/1/2015 10:02	Calibrations	19.82	mg / cm ^2				1	0.26
3	12/1/2015 10:02	Calibrations	9.42	mg / cm ^2				1.1	0.25
7	12/1/2015 10:05	Calibrations	20	mg / cm ^2				1	0.4
67	12/1/2015 10:46	Calibrations	8.38	mg / cm ^2				1.1	0.3
71	12/1/2015 10:54	Calibrations	6.36	mg / cm ^2				1	0.28
554	12/1/2015 14:45	Calibrations	19.84	mg / cm ^2				1	0.3
555	12/1/2015 16:02	Calibrations	120.8	cps	380.2	4.14	2.46	0.56	0.01
556	12/1/2015 16:04	Calibrations	19.85	mg / cm ^2				1	0.3
810	12/1/2015 18:33	Calibrations	19.85	mg / cm ^2				1	0.3
811	12/1/2015 18:50	Calibrations	120.8	cps	378.72	4.14	2.44	0.44	0.01
814	12/1/2015 18:53	Calibrations	19.84	mg / cm ^2				1	0.13
957	12/1/2015 20:05	Calibrations	8.14	mg / cm ^2				1.1	0.4
958	12/1/2015 20:08	Calibrations	116.92	cps	383.61	4.14	2.45	0.46	0.01
959	12/1/2015 20:10	Calibrations	19.9	mg / cm ^2				1	0.6
1401	12/1/2015 23:04	Calibrations	8.68	mg / cm ^2				1.1	0.4

Confirmed Positives Component Types

Confirmed Positive Component Types
Baker Victory Services, Vincent Cottage, Lackawanna, NY

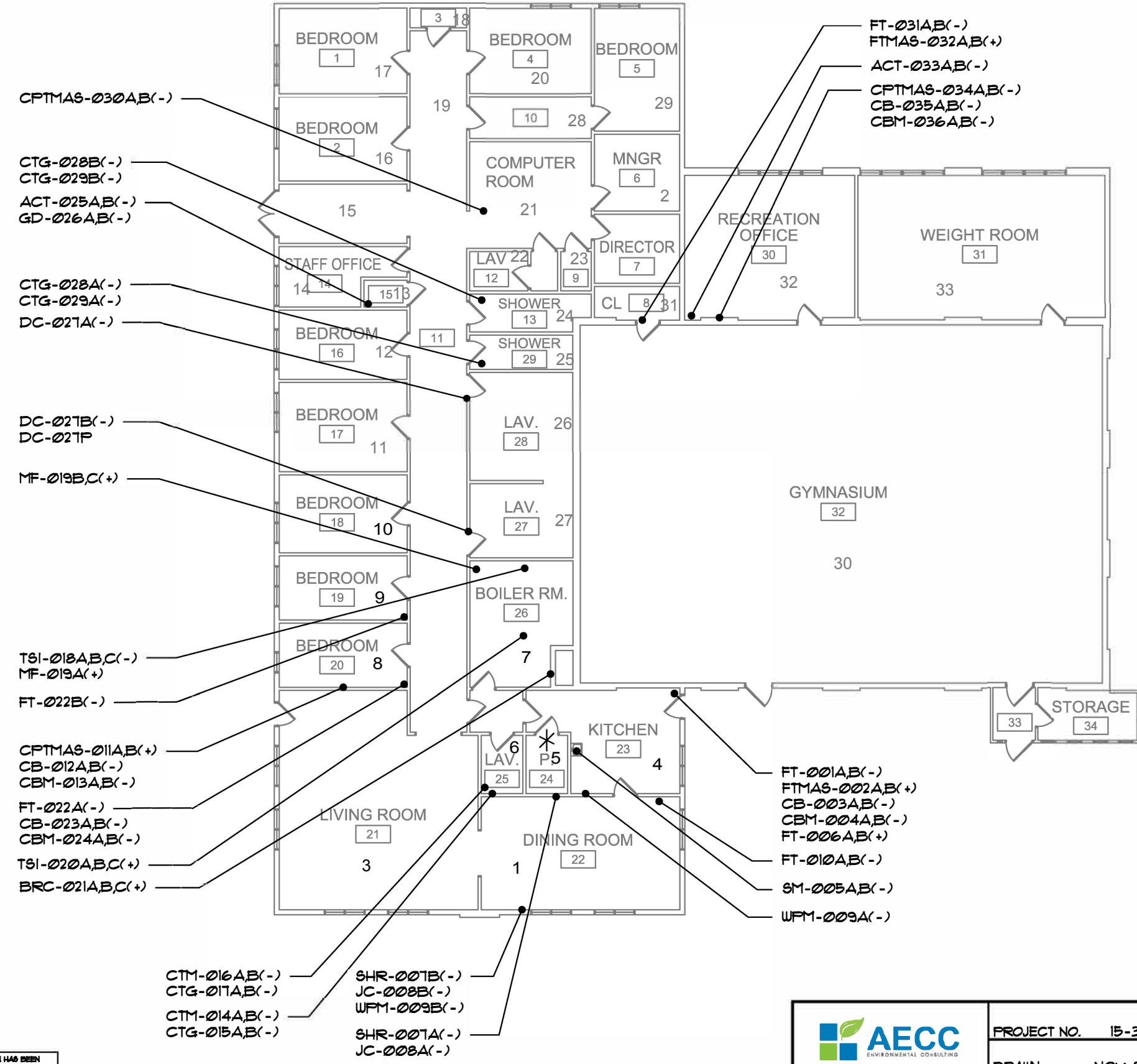


Room 22 – Ladder



Room 33 – Glazed Block Window Sill

Site Plans



THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. AECC MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

LEGEND:
 * NO ACCESS

<p>Asbestos & Environmental Consulting Corporation 6308 Fly Road East Syracuse, NY 13057</p>	PROJECT NO. 15-300	Baker Victory Services - Vincent Cottage 150 Martin Road Lackawanna, New York 14218 Floor Plan	FIGURE 1
	DRAWN: NOV. 2015		
	DRAWN BY: HS	Limited Hazardous Material Pre-Renovation Survey	
	CHECKED BY: BB		

Vincent Cottage

Confirmed Positives

EcoSpect, Inc
5760 Route 96, Romulus, NY 14541

Customer: Asbestos Environmental Consulting Corp
6308 Fly Rd, East Syracuse NY 13057

Project: Vincent Cottage
Baker Victory Services, Lackawanna, NY 14218

Confirmed Positives									
#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
571	Vincent Cottage	Ladder	Steel	Wall 4	Black	22	Positive	4	6.1
50	Vincent Cottage	Window Sill	Glazed Block	Wall 1	White	33	Positive	3.1	3.3
53	Vincent Cottage	Window Sill	Glazed Block	Wall 3	Gray	33	Positive	2.7	3.9

XRF Results

XRF & Labs									
#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
356	Vincent Cottage	Wall	Sheetrock	Wall 1	Yellow	1	Negative	0	-0.27
357	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	1	Negative	0	-0.14
358	Vincent Cottage	Radiator	Steel	Wall 1	Brown	1	Negative	0	0.09
359	Vincent Cottage	Storm Window	Steel	Wall 1	White	1	Negative	0	-0.33
360	Vincent Cottage	Wall	Sheetrock	Wall 2	Yellow	1	Negative	0	-0.36
361	Vincent Cottage	Door Molding	Wood	Wall 2	Brown	1	Negative	0	-0.69
362	Vincent Cottage	Wall	Sheetrock	Wall 3	Yellow	1	Negative	0	0.3
363	Vincent Cottage	Door Molding	Steel	Wall 3	Brown	1	Negative	0.01	0.01
365	Vincent Cottage	Door	Steel	Wall 3	Brown	1	Negative	0	-0.03
366	Vincent Cottage	Wall	Sheetrock	Wall 4	Yellow	1	Negative	0	0.18
367	Vincent Cottage	Wall	Masonry	Wall 1	Blue	2	Negative	0	-0.26
368	Vincent Cottage	Wall	Masonry	Wall 2	Blue	2	Negative	0	-0.09
369	Vincent Cottage	Wall	Sheetrock	Wall 2	Blue	2	Negative	0	-0.24
370	Vincent Cottage	Door Molding	Steel	Wall 2	Gray	2	Negative	0	-0.67
371	Vincent Cottage	Door	Steel	Wall 2	Gray	2	Negative	0	-0.37
372	Vincent Cottage	Wall	Masonry	Wall 3	Blue	2	Negative	0.02	-0.93
373	Vincent Cottage	Wall	Masonry	Wall 4	Blue	2	Negative	0	0.12
374	Vincent Cottage	Radiator	Steel	Wall 4	Blue	2	Negative	0	-0.36
375	Vincent Cottage	Radiator	Steel	Wall 1	Brown	3	Negative	0	-0.02
376	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	3	Negative	0	-0.07
377	Vincent Cottage	Wall	Masonry	Wall 1	Brown	3	Negative	0	-0.19
378	Vincent Cottage	Window Sill	Steel	Wall 1	Black	3	Negative	0	-0.62
379	Vincent Cottage	Storm Window	Steel	Wall 1	White	3	Negative	0	-0.54
380	Vincent Cottage	Wall	Masonry	Wall 2	Brown	3	Negative	0	-0.21
381	Vincent Cottage	Window Molding	Wood	Wall 2	Brown	3	Negative	0	-0.02
382	Vincent Cottage	Door Jamb	Steel	Wall 2	Brown	3	Negative	0	0.16
383	Vincent Cottage	Door	Steel	Wall 2	Brown	3	Negative	0	0.11
384	Vincent Cottage	Wall	Masonry	Wall 3	Brown	3	Negative	0	-0.78
385	Vincent Cottage	Door	Steel	Wall 3	Gray	3	Negative	0	0.7
386	Vincent Cottage	Door Molding	Steel	Wall 3	Brown	3	Negative	0	-0.11
387	Vincent Cottage	Wall	Masonry	Wall 4	Brown	3	Negative	0	-0.65
388	Vincent Cottage	Wall	Masonry	Wall 1	Yellow	4	Negative	0	-0.6

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
389	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	4	Negative	0	-0.3
390	Vincent Cottage	Door Molding	Steel	Wall 1	Brown	4	Negative	0	-0.41
391	Vincent Cottage	Door	Steel	Wall 1	Brown	4	Negative	0	-0.79
392	Vincent Cottage	Wall	Masonry	Wall 2	Yellow	4	Negative	0.03	-0.6
393	Vincent Cottage	Door	Wood	Wall 2	Brown	4	Negative	0	-0.15
394	Vincent Cottage	Wall	Brick	Wall 3	Yellow	4	Negative	0	-0.58
395	Vincent Cottage	Radiator	Steel	Wall 3	Yellow	4	Negative	0.01	-0.66
396	Vincent Cottage	Storm Window	Steel	Wall 4	White	4	Negative	0	-0.13
397	Vincent Cottage	Door Molding	Steel	Wall 4	Brown	4	Negative	0.03	-0.09
398	Vincent Cottage	Door	Steel	Wall 4	Brown	4	Negative	0.02	0.01
399	Vincent Cottage	Wall	Masonry	Wall 4	Yellow	4	Negative	0.01	0.09
400	Vincent Cottage	Wall	Masonry	Wall 1	Yellow	5	Negative	0	0.06
401	Vincent Cottage	Wall	Masonry	Wall 2	Yellow	5	Negative	0.02	-0.19
402	Vincent Cottage	Wall	Masonry	Wall 3	Yellow	5	Negative	0	0.02
403	Vincent Cottage	Door Molding	Steel	Wall 3	Yellow	5	Negative	0.03	-0.25
404	Vincent Cottage	Door	Wood	Wall 3	Brown	5	Negative	0	-0.13
405	Vincent Cottage	Wall	Masonry	Wall 4	Yellow	5	Negative	0.02	-0.49
406	Vincent Cottage	Wall	Masonry	Wall 1	Blue	6	Negative	0	-0.5
407	Vincent Cottage	Wall	Ceramic	Wall 1	Yellow	6	Negative	0.25	-0.14
408	Vincent Cottage	Floor	Ceramic	Wall 1	Brown	6	Negative	0.04	-0.3
409	Vincent Cottage	Wall	Ceramic	Wall 2	Yellow	6	Negative	0.2	-0.2
410	Vincent Cottage	Wall	Masonry	Wall 2	Blue	6	Negative	0	-0.4
411	Vincent Cottage	Ceiling	Sheetrock	Wall 2	White	6	Negative	0	-0.17
412	Vincent Cottage	Wall	Ceramic	Wall 3	Yellow	6	Negative	0.05	-0.28
413	Vincent Cottage	Wall	Masonry	Wall 3	Blue	6	Negative	0	-0.13
414	Vincent Cottage	Door Molding	Steel	Wall 3	Orange	6	Negative	0	-0.19
415	Vincent Cottage	Door	Wood	Wall 3	Brown	6	Negative	0	-0.34
416	Vincent Cottage	Wall	Masonry	Wall 4	Blue	6	Negative	0	-0.63
417	Vincent Cottage	Wall	Ceramic	Wall 4	Yellow	6	Negative	0.07	-0.19
418	Vincent Cottage	Wall	Masonry	Wall 1	Brown	7	Negative	0	0.13
419	Vincent Cottage	Door Molding	Steel	Wall 1	Brown	7	Negative	0.03	0.19
420	Vincent Cottage	Door	Wood	Wall 1	Brown	7	Negative	0	-0.36
421	Vincent Cottage	Wall	Masonry	Wall 2	Brown	7	Negative	0.01	-0.46

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
422	Vincent Cottage	Wall	Masonry	Wall 3	Brown	7	Negative	0.03	-0.54
423	Vincent Cottage	Wall	Masonry	Wall 4	Brown	7	Negative	0.03	-0.01
424	Vincent Cottage	Floor	Masonry	Wall 4	Gray	7	Negative	0	-0.14
425	Vincent Cottage	Wall	Masonry	Wall 4	Blue	8	Negative	0	-0.35
426	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	8	Negative	0	-0.06
427	Vincent Cottage	Door Molding	Steel	Wall 4	Green	8	Negative	0	-0.05
428	Vincent Cottage	Door	Steel	Wall 4	Green	8	Negative	0	0.6
429	Vincent Cottage	Radiator	Steel	Wall 4	Gray	8	Negative	0	-0.52
430	Vincent Cottage	Wall	Masonry	Wall 4	Blue	8	Negative	0	-0.21
431	Vincent Cottage	Wall	Brick	Wall 4	Blue	8	Negative	0	-0.56
432	Vincent Cottage	Wall	Masonry	Wall 2	Blue	8	Negative	0	0.05
433	Vincent Cottage	Window Sill	Wood	Wall 2	Black	8	Negative	0	-0.07
434	Vincent Cottage	Storm Window	Steel	Wall 2	White	8	Negative	0	-0.42
435	Vincent Cottage	Wall	Masonry	Wall 1	Blue	8	Negative	0	-0.59
436	Vincent Cottage	Wall	Masonry	Wall 4	Blue	9	Negative	0.01	0.06
437	Vincent Cottage	Door Molding	Steel	Wall 4	Green	9	Negative	0	-0.54
438	Vincent Cottage	Door	Steel	Wall 4	Green	9	Negative	0	-0.11
439	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	9	Negative	0	-0.45
440	Vincent Cottage	Wall	Masonry	Wall 1	Blue	9	Negative	0	-0.44
441	Vincent Cottage	Wall	Wood	Wall 2	Brown	9	Negative	0	-0.39
442	Vincent Cottage	Radiator	Steel	Wall 2	Gray	9	Negative	0	-0.46
443	Vincent Cottage	Storm Window	Steel	Wall 2	White	9	Negative	0	-0.01
444	Vincent Cottage	Window Sill	Wood	Wall 2	Black	9	Negative	0	-0.97
445	Vincent Cottage	Wall	Masonry	Wall 3	Blue	9	Negative	0	-0.02
446	Vincent Cottage	Wall	Masonry	Wall 4	Blue	10	Negative	0	0.12
447	Vincent Cottage	Door Molding	Steel	Wall 4	Green	10	Negative	0	-0.17
448	Vincent Cottage	Door	Steel	Wall 4	Green	10	Negative	0	-0.17
449	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	10	Negative	0	0.6
450	Vincent Cottage	Wall	Masonry	Wall 1	Blue	10	Negative	0	-0.34
451	Vincent Cottage	Wall	Wood	Wall 2	Brown	10	Negative	0	0.24
452	Vincent Cottage	Window Sill	Wood	Wall 2	Black	10	Negative	0	-0.7
453	Vincent Cottage	Storm Window	Steel	Wall 2	White	10	Negative	0	-0.25
454	Vincent Cottage	Radiator	Steel	Wall 2	Gray	10	Negative	0	0

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
455	Vincent Cottage	Window Molding	Wood	Wall 2	Brown	10	Negative	0	0.2
456	Vincent Cottage	Wall	Masonry	Wall 3	Blue	10	Negative	0	-0.59
457	Vincent Cottage	Wall	Masonry	Wall 4	Blue	11	Negative	0	-0.4
458	Vincent Cottage	Door Molding	Steel	Wall 4	Green	11	Negative	0	-0.84
459	Vincent Cottage	Door	Steel	Wall 4	Green	11	Negative	0	0.26
460	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	11	Negative	0	-0.07
461	Vincent Cottage	Wall	Masonry	Wall 1	Blue	11	Negative	0.01	-0.21
462	Vincent Cottage	Wall	Wood	Wall 2	Brown	11	Negative	0	0.26
463	Vincent Cottage	Window Sill	Wood	Wall 2	Black	11	Negative	0	-0.39
464	Vincent Cottage	Window Molding	Wood	Wall 2	Brown	11	Negative	0.01	-0.03
465	Vincent Cottage	Storm Window	Steel	Wall 2	White	11	Negative	0	0.3
466	Vincent Cottage	Radiator	Steel	Wall 2	Gray	11	Negative	0	-0.49
467	Vincent Cottage	Wall	Masonry	Wall 3	Blue	11	Negative	0	0.03
468	Vincent Cottage	Wall	Masonry	Wall 4	Blue	12	Negative	0	-0.2
469	Vincent Cottage	Door Molding	Steel	Wall 4	Green	12	Negative	0	-0.07
470	Vincent Cottage	Door	Steel	Wall 4	Green	12	Negative	0	0.3
471	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	12	Negative	0	0.22
472	Vincent Cottage	Wall	Masonry	Wall 1	Blue	12	Negative	0	0.11
473	Vincent Cottage	Wall	Wood	Wall 2	Brown	12	Negative	0	-0.02
474	Vincent Cottage	Window Sill	Wood	Wall 2	Black	12	Negative	0	-0.38
475	Vincent Cottage	Window Molding	Wood	Wall 2	Brown	12	Negative	0.08	-0.65
476	Vincent Cottage	Storm Window	Steel	Wall 2	White	12	Negative	0	-0.39
477	Vincent Cottage	Radiator	Steel	Wall 2	Gray	12	Negative	0	-0.58
478	Vincent Cottage	Wall	Masonry	Wall 3	Blue	12	Negative	0	-0.14
479	Vincent Cottage	Wall	Masonry	Wall 4	Blue	13	Negative	0	-0.62
480	Vincent Cottage	Door Molding	Steel	Wall 4	Green	13	Negative	0	0.6
481	Vincent Cottage	Door	Steel	Wall 4	Green	13	Negative	0	-0.17
482	Vincent Cottage	Wall	Masonry	Wall 1	Blue	13	Negative	0.13	0.6
483	Vincent Cottage	Wall	Masonry	Wall 2	Blue	13	Negative	0	-0.29
484	Vincent Cottage	Wall	Masonry	Wall 3	Blue	13	Negative	0	-0.17
485	Vincent Cottage	Wall	Masonry	Wall 4	Gray	14	Negative	0	-0.34
486	Vincent Cottage	Door Molding	Steel	Wall 4	Green	14	Negative	0	-0.54
487	Vincent Cottage	Door	Steel	Wall 4	Green	14	Negative	0	0.01

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
488	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	14	Negative	0	-0.06
489	Vincent Cottage	Wall	Masonry	Wall 1	Gray	14	Negative	0	-0.05
490	Vincent Cottage	Wall	Wood	Wall 2	Gray	14	Negative	0.02	-0.43
491	Vincent Cottage	Window Sill	Wood	Wall 2	Black	14	Negative	0	-0.68
492	Vincent Cottage	Storm Window	Steel	Wall 2	White	14	Negative	0	-0.52
493	Vincent Cottage	Radiator	Steel	Wall 2	Gray	14	Negative	0	0.3
494	Vincent Cottage	Wall	Masonry	Wall 3	Gray	14	Negative	0.01	-0.22
495	Vincent Cottage	Wall	Masonry	Wall 4	Green	15	Negative	0	0.26
496	Vincent Cottage	Door Molding	Steel	Wall 4	Green	15	Negative	0	-0.21
497	Vincent Cottage	Door Molding	Steel	Wall 4	White	15	Negative	0	-0.06
498	Vincent Cottage	Ceiling	Sheetrock	Wall 4	White	15	Negative	0	-0.25
499	Vincent Cottage	Wall	Masonry	Wall 1	Green	15	Negative	0.01	-0.37
500	Vincent Cottage	Radiator	Steel	Wall 1	Brown	15	Negative	0.01	0.02
501	Vincent Cottage	Wall	Masonry	Wall 2	Green	15	Negative	0	-0.05
502	Vincent Cottage	Door Molding	Steel	Wall 2	Brown	15	Negative	0.02	0.6
503	Vincent Cottage	Door	Steel	Wall 2	Brown	15	Negative	0	0.17
504	Vincent Cottage	Wall	Masonry	Wall 3	Green	15	Negative	0	-0.18
505	Vincent Cottage	Wall	Masonry	Wall 1	Blue	16	Negative	0.01	0.09
506	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	16	Negative	0	-0.14
507	Vincent Cottage	Wall	Wood	Wall 2	Brown	16	Negative	0	-0.1
508	Vincent Cottage	Window Molding	Wood	Wall 2	Brown	16	Negative	0	-0.04
509	Vincent Cottage	Window Sill	Wood	Wall 2	Black	16	Negative	0	-0.05
510	Vincent Cottage	Storm Window	Steel	Wall 2	White	16	Negative	0	0.13
511	Vincent Cottage	Radiator	Steel	Wall 2	Gray	16	Negative	0	-0.03
512	Vincent Cottage	Wall	Masonry	Wall 3	Blue	16	Negative	0	-0.06
513	Vincent Cottage	Wall	Masonry	Wall 4	Blue	16	Negative	0.01	-0.12
514	Vincent Cottage	Door Molding	Steel	Wall 4	Green	16	Negative	0.01	-0.2
515	Vincent Cottage	Door	Steel	Wall 4	Green	16	Negative	0	-0.04
516	Vincent Cottage	Wall	Masonry	Wall 1	Blue	17	Negative	0	-0.78
517	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	17	Negative	0.03	-0.08
518	Vincent Cottage	Wall	Wood	Wall 2	Blue	17	Negative	0	-0.68
519	Vincent Cottage	Window Molding	Wood	Wall 2	Brown	17	Negative	0	-0.13
520	Vincent Cottage	Window Sill	Wood	Wall 2	Black	17	Negative	0	-0.4

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
521	Vincent Cottage	Storm Window	Steel	Wall 2	White	17	Negative	0	0.07
522	Vincent Cottage	Radiator	Steel	Wall 2	Gray	17	Negative	0	-0.09
523	Vincent Cottage	Wall	Wood	Wall 3	Blue	17	Negative	0	-0.17
524	Vincent Cottage	Wall	Masonry	Wall 4	Blue	17	Negative	0	-0.37
525	Vincent Cottage	Door Molding	Steel	Wall 4	Green	17	Negative	0	0.02
526	Vincent Cottage	Door	Steel	Wall 4	Green	17	Negative	0	0.3
528	Vincent Cottage	Wall	Masonry	Wall 1	Blue	18	Negative	0	-0.58
529	Vincent Cottage	Door Molding	Steel	Wall 1	Green	18	Negative	0	-0.1
530	Vincent Cottage	Door	Steel	Wall 1	Green	18	Negative	0	0.1
531	Vincent Cottage	Wall	Sheetrock	Wall 3	Blue	18	Negative	0	-0.34
532	Vincent Cottage	Wall	Masonry	Wall 4	Blue	18	Negative	0	-0.73
533	Vincent Cottage	Wall	Masonry	Wall 1	Green	19	Negative	0	-0.1
534	Vincent Cottage	Wall	Masonry	Wall 2	Green	19	Negative	0	-0.27
535	Vincent Cottage	Ceiling	Sheetrock	Wall 2	White	19	Negative	0	-0.01
536	Vincent Cottage	Door Molding	Steel	Wall 2	Green	19	Negative	0	0.26
537	Vincent Cottage	Wall	Masonry	Wall 3	Green	19	Negative	0	-0.36
538	Vincent Cottage	Wall	Masonry	Wall 4	Green	19	Negative	0.01	-0.22
539	Vincent Cottage	Wall	Masonry	Wall 1	Blue	20	Negative	0	-0.66
540	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	20	Negative	0.01	-0.6
541	Vincent Cottage	Wall	Masonry	Wall 2	Blue	20	Negative	0	-0.35
542	Vincent Cottage	Door Molding	Steel	Wall 2	Green	20	Negative	0	-0.25
543	Vincent Cottage	Door	Steel	Wall 2	Green	20	Negative	0	-0.42
544	Vincent Cottage	Wall	Wood	Wall 3	Brown	20	Negative	0	-0.28
545	Vincent Cottage	Window Molding	Wood	Wall 3	Brown	20	Negative	0	-0.37
546	Vincent Cottage	Window Sill	Wood	Wall 3	Black	20	Negative	0	-0.47
547	Vincent Cottage	Storm Window	Steel	Wall 3	White	20	Negative	0	-0.18
548	Vincent Cottage	Radiator	Steel	Wall 3	Gray	20	Negative	0.01	0.29
549	Vincent Cottage	Wall	Masonry	Wall 4	Blue	20	Negative	0	-1.02
550	Vincent Cottage	Wall	Masonry	Wall 1	Gray	21	Negative	0	-0.49
551	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	21	Negative	0	-0.28
552	Vincent Cottage	Wall	Masonry	Wall 2	Gray	21	Negative	0	-0.07
553	Vincent Cottage	Wall	Masonry	Wall 3	Gray	21	Negative	0	-0.44
554	Vincent Cottage	Wall	Masonry	Wall 4	Gray	21	Negative	0.01	-0.11

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
555	Vincent Cottage	Radiator	Steel	Wall 4	Gray	21	Negative	0	-0.14
556	Vincent Cottage	Door Molding	Steel	Wall 4	Blue	21	Negative	0	0.2
557	Vincent Cottage	Door	Steel	Wall 4	Blue	21	Negative	0	-0.63
558	Vincent Cottage	Wall	Ceramic	Wall 1	Red	22	Negative	0.02	0.08
559	Vincent Cottage	Wall	Masonry	Wall 1	Orange	22	Negative	0.01	-0.13
560	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	22	Negative	0.03	-0.01
562	Vincent Cottage	Wall	Ceramic	Wall 2	Red	22	Negative	0.03	-0.28
563	Vincent Cottage	Wall	Ceramic	Wall 3	Red	22	Negative	0.02	-0.29
564	Vincent Cottage	Stall	Steel	Wall 3	Brown	22	Negative	0.9	0.9
565	Vincent Cottage	Wall	Ceramic	Wall 3	Red	22	Negative	0.08	-0.28
567	Vincent Cottage	Wall	Masonry	Wall 3	Orange	22	Negative	0.01	-0.03
568	Vincent Cottage	Door Molding	Steel	Wall 3	Orange	22	Negative	0.01	0.23
569	Vincent Cottage	Door	Wood	Wall 3	Blue	22	Negative	0	-0.32
570	Vincent Cottage	Wall	Masonry	Wall 4	Orange	22	Negative	0	0.1
571	Vincent Cottage	Ladder	Steel	Wall 4	Black	22	Positive	4	6.1
572	Vincent Cottage	Door	Wood	Wall 4	Brown	22	Negative	0	0.09
573	Vincent Cottage	Wall	Masonry	Wall 1	Brown	23	Negative	0.01	0.13
574	Vincent Cottage	Wall	Masonry	Wall 2	Brown	23	Negative	0	0.5
575	Vincent Cottage	Wall	Masonry	Wall 2	Brown	23	Negative	0.01	0.24
576	Vincent Cottage	Ceiling	Sheetrock	Wall 2	White	23	Negative	0	-0.28
577	Vincent Cottage	Door Molding	Steel	Wall 3	Green	23	Negative	0.03	0.16
578	Vincent Cottage	Door Molding	Wood	Wall 3	Gray	23	Negative	0	-0.27
579	Vincent Cottage	Wall	Masonry	Wall 4	Brown	23	Negative	0.03	0.08
580	Vincent Cottage	Wall	Ceramic	Wall 1	White	24	Negative	0.04	0.09
581	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	24	Negative	0	-0.37
582	Vincent Cottage	Wall	Ceramic	Wall 2	White	24	Negative	0.01	-0.46
583	Vincent Cottage	Door Molding	Steel	Wall 2	Green	24	Negative	0	0.08
584	Vincent Cottage	Door	Steel	Wall 2	Green	24	Negative	0	-0.09
585	Vincent Cottage	Wall	Ceramic	Wall 3	White	24	Negative	0	-0.33
586	Vincent Cottage	Wall	Ceramic	Wall 4	White	24	Negative	0.01	-0.48
587	Vincent Cottage	Wall	Ceramic	Wall 1	White	25	Negative	0.04	-0.48
588	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	25	Negative	0.01	-0.35
589	Vincent Cottage	Wall	Ceramic	Wall 2	White	25	Negative	0.01	-0.45

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
590	Vincent Cottage	Door Molding	Steel	Wall 2	Green	25	Negative	0	-0.04
591	Vincent Cottage	Door	Steel	Wall 2	Green	25	Negative	0	-0.02
592	Vincent Cottage	Wall	Ceramic	Wall 3	White	25	Negative	0.01	-0.65
593	Vincent Cottage	Wall	Ceramic	Wall 4	White	25	Negative	0.01	-0.2
594	Vincent Cottage	Wall	Ceramic	Wall 1	Blue	26	Negative	0.01	-0.62
595	Vincent Cottage	Floor	Ceramic	Wall 1	Blue	26	Negative	0.03	0.7
596	Vincent Cottage	Floor	Ceramic	Wall 1	Blue	26	Negative	0	-0.16
597	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	26	Negative	0	-0.02
598	Vincent Cottage	Wall	Ceramic	Wall 2	Blue	26	Negative	0.01	-0.38
599	Vincent Cottage	Stall	Steel	Wall 3	Blue	26	Negative	0	-0.91
600	Vincent Cottage	Door Molding	Steel	Wall 3	Green	26	Negative	0	-0.6
601	Vincent Cottage	Door	Steel	Wall 3	Green	26	Negative	0	-0.03
602	Vincent Cottage	Wall	Ceramic	Wall 3	Blue	26	Negative	0.03	0.2
603	Vincent Cottage	Wall	Ceramic	Wall 4	Blue	26	Negative	0.01	-0.43
604	Vincent Cottage	Wall	Ceramic	Wall 1	Brown	27	Negative	0.08	-0.15
605	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	27	Negative	0	-0.18
606	Vincent Cottage	Wall	Ceramic	Wall 2	Brown	27	Negative	0.05	-0.71
607	Vincent Cottage	Wall	Ceramic	Wall 3	White	27	Negative	0.09	-0.34
608	Vincent Cottage	Door Molding	Steel	Wall 3	Green	27	Negative	0	-0.01
609	Vincent Cottage	Door	Steel	Wall 3	Green	27	Negative	0	-0.5
610	Vincent Cottage	Stall	Steel	Wall 4	Brown	27	Negative	0	-0.16
611	Vincent Cottage	Wall	Ceramic	Wall 4	Brown	27	Negative	0.08	0.07
8	Vincent Cottage	Wall	Masonry	Wall 1	Blue	28	Negative	0.01	0.17
9	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	28	Negative	0	0.04
10	Vincent Cottage	Wall	Masonry	Wall 2	Blue	28	Negative	0	0.16
11	Vincent Cottage	Door Molding	Steel	Wall 2	Blue	28	Negative	0	-0.13
12	Vincent Cottage	Door	Steel	Wall 2	Blue	28	Negative	0	0.6
13	Vincent Cottage	Wall	Masonry	Wall 3	Blue	28	Negative	0	-0.24
14	Vincent Cottage	Wall	Masonry	Wall 4	Blue	28	Negative	0	0.4
15	Vincent Cottage	Wall	Masonry	Wall 1	Blue	29	Negative	0	0.2
16	Vincent Cottage	Ceiling	Sheetrock	Wall 1	White	29	Negative	0	0.3
17	Vincent Cottage	Wall	Sheetrock	Wall 2	Blue	29	Negative	0	0.11
18	Vincent Cottage	Wall	Sheetrock	Wall 3	Blue	29	Negative	0	0.02

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
19	Vincent Cottage	Storm Window	Steel	Wall 3	Blue	29	Negative	0	-0.3
20	Vincent Cottage	Window Molding	Wood	Wall 3	Blue	29	Negative	0	-0.22
21	Vincent Cottage	Radiator	Steel	Wall 3	Gray	29	Negative	0	-0.24
22	Vincent Cottage	Wall	Masonry	Wall 4	Blue	29	Negative	0.01	0.06
23	Vincent Cottage	Wall	Masonry	Wall 1	Blue	30	Negative	0.04	0.4
24	Vincent Cottage	Door Molding	Steel	Wall 1	Blue	30	Negative	0	-0.03
25	Vincent Cottage	Door	Steel	Wall 1	Gray	30	Negative	0	-0.21
26	Vincent Cottage	Window Molding	Steel	Wall 1	Brown	30	Negative	0.02	0.3
27	Vincent Cottage	Wall	Masonry	Wall 2	Blue	30	Negative	0.03	0.22
28	Vincent Cottage	Wall	Masonry	Wall 3	Blue	30	Negative	0.02	-0.03
29	Vincent Cottage	Wall	Masonry	Wall 4	Blue	30	Negative	0.05	0.5
30	Vincent Cottage	Wall	Masonry	Wall 1	Brown	31	Negative	0	-0.39
31	Vincent Cottage	Door Molding	Steel	Wall 1	Brown	31	Negative	0.01	0.5
32	Vincent Cottage	Door	Steel	Wall 1	Brown	31	Negative	0	-0.37
33	Vincent Cottage	Ceiling	Sheetrock	Wall 1	Brown	31	Negative	0	0.21
34	Vincent Cottage	Wall	Masonry	Wall 2	Brown	31	Negative	0	0.19
35	Vincent Cottage	Wall	Masonry	Wall 3	Brown	31	Negative	0	0.4
36	Vincent Cottage	Wall	Masonry	Wall 4	Brown	31	Negative	0.01	0.2
37	Vincent Cottage	Wall	Masonry	Wall 1	White	32	Negative	0	0.02
38	Vincent Cottage	Door Molding	Steel	Wall 1	Blue	32	Negative	0.04	0.22
39	Vincent Cottage	Door	Steel	Wall 1	Blue	32	Negative	0	-0.77
41	Vincent Cottage	Wall	Masonry	Wall 2	White	32	Negative	0	0.3
42	Vincent Cottage	Wall	Masonry	Wall 3	White	32	Negative	0.01	0.01
43	Vincent Cottage	Window Molding	Steel	Wall 3	Gray	32	Negative	0	-0.05
44	Vincent Cottage	Radiator	Steel	Wall 3	White	32	Negative	0	0.3
45	Vincent Cottage	Wall	Wood	Wall 4	Brown	32	Negative	0	0.01
46	Vincent Cottage	Wall	Masonry	Wall 1	White	33	Negative	0.03	0.16
47	Vincent Cottage	Door Molding	Steel	Wall 1	White	33	Negative	0.01	-0.34
48	Vincent Cottage	Door	Steel	Wall 1	Blue	33	Negative	0	-0.11
49	Vincent Cottage	Window Molding	Steel	Wall 1	White	33	Negative	0.01	0.07
50	Vincent Cottage	Window Sill	Glazed Block	Wall 1	White	33	Positive	3.1	3.3
51	Vincent Cottage	Wall	Masonry	Wall 2	White	33	Negative	0.01	0.18
52	Vincent Cottage	Wall	Masonry	Wall 3	White	33	Negative	0	0.28

#	Site	Component	Substrate	Side	Condition	Room	Results	PbL	PbK
53	Vincent Cottage	Window Sill	Glazed Block	Wall 3	Gray	33	Positive	2.7	3.9
54	Vincent Cottage	Window Molding	Steel	Wall 3	Gray	33	Negative	0	-0.68
55	Vincent Cottage	Radiator	Steel	Wall 3	White	33	Negative	0	0.4
56	Vincent Cottage	Wall	Wood	Wall 4	Brown	33	Negative	0	0.04
57	Vincent Cottage	Door Molding	Steel	Wall 1	Brown	34	Negative	0	-0.18
58	Vincent Cottage	Door	Steel	Wall 1	Brown	34	Negative	0	0.6
59	Vincent Cottage	Wall	Brick	Wall 3	Brown	34	Negative	0	0.27
60	Vincent Cottage	Door Molding	Steel	Wall 3	Blue	34	Negative	0	0.2
61	Vincent Cottage	Door	Steel	Wall 3	Blue	34	Negative	0	-0.47
62	Vincent Cottage	Wall	Wood	Wall 4	Brown	34	Negative	0	-0.32
63	Vincent Cottage	Door Molding	Steel	Wall 4	Brown	34	Negative	0	-0.41
64	Vincent Cottage	Door	Steel	Wall 4	Brown	34	Negative	0	0.19

Signature Page



Signature Page

The individual listed below completed XRF testing at Baker Victory Services, Lackawanna, NY:

Daryl Heffron, Risk Assessor

Performance Characteristic Sheet

Performance Characteristic Sheet

EFFECTIVE DATE: September 24, 2004

EDITION NO.: 1

MANUFACTURER AND MODEL:

Make: *Niton LLC*Tested Model: *XLp 300*Source: ^{109}Cd

Note: This PCS is also applicable to the equivalent model variations indicated below, for the Lead-in-Paint K+L variable reading time mode, in the XLi and XLp series:

XLi 300A, XLi 301A, XLi 302A and XLi 303A.

XLp 300A, XLp 301A, XLp 302A and XLp 303A.

XLi 700A, XLi 701A, XLi 702A and XLi 703A.

XLp 700A, XLp 701A, XLp 702A, and XLp 703A.

Note: The XLi and XLp versions refer to the shape of the handle part of the instrument. The differences in the model numbers reflect other modes available, in addition to Lead-in-Paint modes. The manufacturer states that specifications for these instruments are identical for the source, detector, and detector electronics relative to the Lead-in-Paint mode.

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Lead-in-Paint K+L variable reading time mode.

XRF CALIBRATION CHECK LIMITS:

0.8 to 1.2 mg/cm ² (inclusive)

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm² in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm² film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

SUBSTRATE CORRECTION:

For XRF results using Lead-in-Paint K+L variable reading time mode, substrate correction is not needed for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

INCONCLUSIVE RANGE OR THRESHOLD:

K+L MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm ²)
Results not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted in August 2004 on 133 testing combinations. The instruments that were used to perform the testing had new sources; one instrument's was installed in November 2003 with 40 mCi initial strength, and the other's was installed June 2004 with 40 mCi initial strength.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

SUBSTRATE CORRECTION VALUE COMPUTATION:

Substrate correction is not needed for brick, concrete, drywall, metal, plaster or wood when using Lead-in-Paint K+L variable reading time mode, the normal operating mode for these instruments. If substrate correction is desired, refer to Chapter 7 of the HUD Guidelines for guidance on correcting XRF results for substrate bias.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use the K+L variable time mode readings.

Conduct XRF retesting at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family housing a result is defined as the average of three readings. In multifamily housing, a result is a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

TESTING TIMES:

For the Lead-in-Paint K+L variable reading time mode, the instrument continues to read until it is moved away from the testing surface, terminated by the user, or the instrument software indicates the reading is complete. The following table provides testing time information for this testing mode. The times have been adjusted for source decay, normalized to the initial source strengths as noted above. Source strength and type of substrate will affect actual testing times. At the time of testing, the instruments had source strengths of 26.6 and 36.6 mCi.

Testing Times Using K+L Reading Mode (Seconds)						
Substrate	All Data			Median for laboratory-measured lead levels (mg/cm ²)		
	25 th Percentile	Median	75 th Percentile	Pb < 0.25	0.25 ≤ Pb < 1.0	1.0 ≤ Pb
Wood Drywall	4	11	19	11	15	11
Metal	4	12	18	9	12	14
Brick Concrete Plaster	8	16	22	15	18	16

CLASSIFICATION RESULTS:

XRF results are classified as positive if they are greater than or equal to the threshold, and negative if they are less than the threshold.

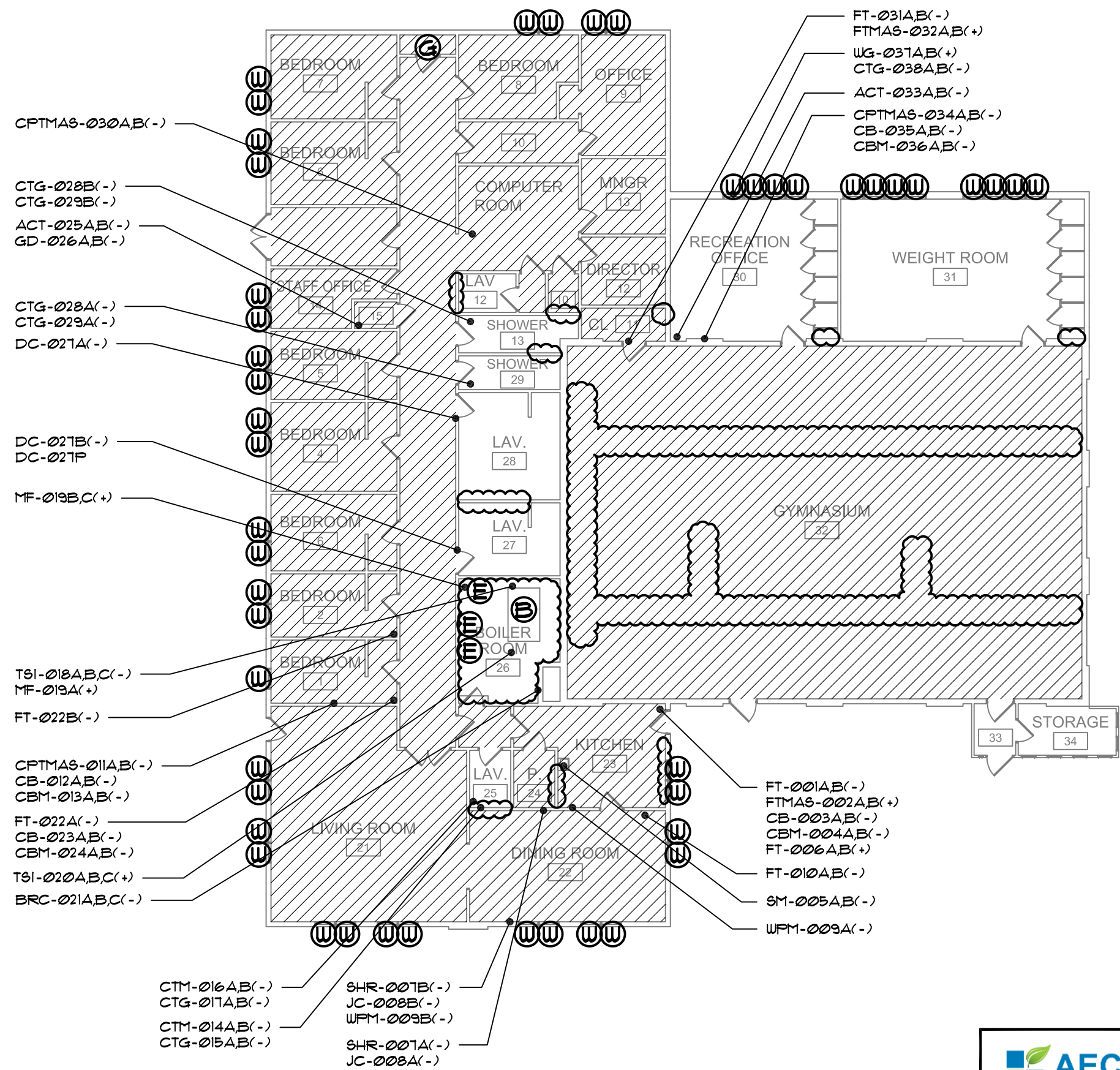
DOCUMENTATION:

A document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.

ATTACHMENT E

FIGURE 1



1 FIRST FLOOR PLAN



2 SECOND FLOOR PLAN

LEGEND:

- ASBESTOS-CONTAINING THERMAL SYSTEM INSULATION
- ASBESTOS-CONTAINING FLOOR TILE AND/OR FLOOR TILE MASTIC
- ASBESTOS-CONTAINING WINDOW GLAZING COMPOUND
- PRESUMED ASBESTOS-CONTAINING BOILER INSULATION/COMPONENTS
- PRESUMED ASBESTOS-CONTAINING ELECTRICAL COMPONENTS
- PRESUMED ASBESTOS-CONTAINING VALVE GASKETS

NOTE: ASBESTOS-CONTAINING MATERIALS MAY BE PRESENT ABOVE HARD CEILING, INSIDE WALL CHASES, INSIDE DOORS, IN THE ATTIC, AND ON THE ROOF. IF THESE AREAS/MATERIALS SHALL BE IMPACTED BY RENOVATION ACTIVITIES, ADDITIONAL INVESTIGATION IS HIGHLY RECOMMENDED PRIOR TO ANY RENOVATION/DEMOLITION ACTIVITIES.

THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. AECC MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

<p>Asbestos & Environmental Consulting Corporation 6308 Fly Road East Syracuse, NY 13057</p>	PROJECT NO. 15-300	<p>Baker Victory Services - Vincent Cottage 150 Martin Road Lackawanna, New York 14218 First Floor and Second Floor Plans</p> <p>Limited Hazardous Material Pre-Renovation Survey</p>	FIGURE 1
	DRAWN: DEC. 2015		
	DRAWN BY: HS		
	CHECKED BY: BB		

SECTION 004002
FORM OF PROPOSAL – SINGLE PRIME

PART 1 GENERAL

1.1 SUMMARY

A. Fill in information:

Date:
TO:
OWNER NAME & ADDRESS:
FROM:
BIDDER NAME & ADDRESS

1.2 GENERAL

A. Pursuant to, and in compliance with, the Procurement and Contracting Requirements, Conditions of the Contract, relative thereto and all of the Contract Documents, including any Addenda issued by the Architect and mailed or delivered to the undersigned prior to the opening of Bids, whether received by the undersigned or not, we, _____

1. having visited the site and being familiar with all conditions and requirements of the Work, hereby propose to furnish all plant, labor, supplies, materials and equipment incidental to CONSTRUCTION WORK as required by and in strict accord with the applicable provisions of the Drawings and Specifications entitled Rev-Up! Renovations, all to the satisfaction and approval of the Architect and the Owner in accordance with the terms and conditions of the Contract Documents for the following sum:

DOLLARS
(\$ _____)
BASE BID

1.3 BID GUARANTEE

A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within [10] days after a written Notice of Award, if offered within [45] days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid.

1. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 TIME OF COMPLETION

A. It is agreed by the undersigned that after receipt of a Notice of Award and a consummation of a Contract Agreement in accord with the terms of the Contract Documents, he will start work within [10] consecutive calendar days of this notice to proceed and fully complete the work in a time that is mutually agreeable.

1.5 ALLOWANCES (REFERENCE SPECIFICATION SECTION 012100)

- A. Specified Allowance as indicated in Specification Section 012100. This amount is to be included in the Base Bid above.
 - 1. Contingency Allowance GC-1: Contingency Allowance to be used at the Owner's discretion:
 - a. **\$10,000**
 - 2. Lump Sum Allowance GC-2: Lump Sum Allowance to cover National Grid fees:
 - a. **\$30,000**
 - 3. Lump Sum Allowance GC-3: Lump Sum Allowance to cover hardware for Door C-1:
 - a. **\$5,000**

1.6 ALTERNATES (REFERENCE SPECIFICATION SECTION 012300.)

A. Enter a whole dollar amount, even if it is zero (\$ 0), for each Alternate. Do not leave any Alternate amount blank. If any amount is blank, it will be assumed the Bidder will provide that Alternate for no change, neither increase nor decrease, in Contract Price.

- 1. Alternate No. 1: Storage Cabinets and sink:

ADD (\$)
	DOLLARS	

- 2. Alternate No. 2 Replace Wood Paneling:

ADD (\$)
	DOLLARS	

- 3. Alternate No. 3 - Finned Tube Enclosures:

ADD (\$)
	DOLLARS	

- 4. Alternate No. 4 Offices and Music Therapy:

ADD (\$)
	DOLLARS	

- 5. Alternate No. 5 - Mechanical Closet 03:

ADD (\$)
	DOLLARS	

1.7 BID SECURITY

A. Bid Security in the form of a Certified or Cashier's Check or a Bid Bond in the form required by the Contract Documents is attached to and made a part of this Proposal.

1.8 REPRESENTATIONS

- A. By submitting this Proposal the Bidder represents and certifies to the Owner and the Architect that
 - 1. It has examined the Contract Documents, the site of the proposed Work, is familiar with the local conditions at the place where the Work is to be performed and fully comprehends the requirements and intent of the plans and specifications for this Project in accordance with the drawings, specifications and other Contract Documents prepared by CPL the Owners Consultant, for this Project.
 - 2. It has examined and reviewed, where applicable, all information and data in the Contract Documents related to existing underground facilities at or contiguous to the site. Bidder shall require of the Owner or Architect no further investigations, explorations, tests or reports with respect to such underground facilities in order for the Bidder to perform the Work of the Proposal within the Contract Time and in accordance with the Contract Documents.

3. It has given notice to the Architect, as required by the Contract Documents of any and all discrepancies it has discovered and accepts the resolution of those discrepancies offered by the Architect.
4. Pursuant to New York State General Municipal Law section 103-d, by submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 - a. The prices in this bid have been arrived at independently without collusion, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 - b. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not be knowingly disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or competitor; and
 - c. No attempt has been made or will be made by bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
 - d. The proposal is based upon the materials, equipment and systems required by the Contract Documents, without exception, unless otherwise set forth in this Proposal in detail.

1.9 CHANGE ORDERS

- A. We propose and agree that the above lump sum shall be adjusted for changes in the Contract Work not included in unit prices by addition of the following costs:
 1. Profit and overhead as permitted in the General Conditions.

1.10 NON-COLLUSIVE BIDDING CERTIFICATION

- A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
 3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

1.11 ACCEPTANCE

- A. When this Proposal is accepted, the undersigned agrees to enter into a Contract with the Owner as provided in the Form of Agreement.

1.12 AFFIRMS

- A. The undersigned affirms and agrees that this Proposal is a firm one which remains in effect and will be irrevocable for a period of forty-five (45) days after opening of Bids.

1.13 TYPE OF BUSINESS

- A. The undersigned hereby represents that it is a (select with circle):
 1. Corporation, Partnership, Individual.
 2. If a Corporation, then the undersigned further represents that it is duly qualified as a Corporation under the laws of New York State and it is authorized to do business in this State.

1.14 PLACE OF BUSINESS

- A. The following is the name and address of the person to whom all notices required in connection with this Proposal may be telephoned, mailed, or delivered.

Name of Contact Person:	
Name of Business or Firm:	
Address:	
Address:	
Telephone:	Fax
Email Address:	
FEIN: Federal Employer Identification No.:	

1.15 EXECUTION OF CONTRACT

- A. When written Notice of Acceptance of the Proposal is mailed or delivered to the undersigned within forty-five (45) days after the opening of Bids, or anytime thereafter should the Proposal not be withdrawn, the undersigned, within ten (10) days, will execute the Form of Agreement with the Owner.

1.16 ADDENDA

- A. Any addenda issued by the Architect and mailed or delivered to the undersigned prior to the Bid opening date shall become part of the Contract Documents. The Bidder shall enter on this list any addenda issued after this Form of Proposal has been received and shall fill in the addenda number and date.

Addendum #		Dated:	
Addendum #		Dated:	
Addendum #		Dated:	
Addendum #		Dated:	

1.17 ASBESTOS

- A. The bidder certifies that no asbestos or asbestos-containing materials will be incorporated into the Work of this Contract.

1.18 AUTHORIZED SIGNATURES FOR PROPOSALS

Individual or Legal Name of Firm or Corporation:
Signature of Representative of Firm or Corporation:
Printed Name and Title:
Date:
If Corporation – provide Seal:

OLV HUMAN SERVICES

REV-UP! RENOVATIONS

16128.00

FORM OF PROPOSAL – SINGLE
PRIME

004002 - 5

END OF SECTION

This page intentionally left blank

**SECTION 005100
AIA A101 AGREEMENT**

PART 1 GENERAL

1.1 SUMMARY

- A. The following is a “Standard Form of Agreement Between Owner and Contractor where the Basis of Payment is a Stipulated Sum,” AIA Document A101-2017, along with Exhibit A – Insurance and Bonds ,is bound with this Section. AIA Document A101-2017 is a standard form of agreement between Owner and Contractor for use where the basis of payment is a stipulated sum (fixed price). AIA Document A101 adopts by reference, and is designed for use with, AIA Document A201–2017, General Conditions of the Contract for Construction.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 005100



AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

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

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

OLV Human Services
790 Ridge Road
Lackawanna, NY 14218

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

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

Rev-Up! Renovations
100 Martin Road
Lackawanna, NY 14218

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

CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C.
d/b/a CPL
26 Mississippi Street
Buffalo, NY 14203

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.
- Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

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

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

Init.

/

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

[X] By the following date: at a time that is mutually agreed upon by the Owner and the Contractor

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

Portion of Work

Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item

Price

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

Item

Price

Conditions for Acceptance

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

Item

Price

§ 4.4 Unit prices, if any:

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

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

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

§ 4.6 Other:

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

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

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

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

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

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

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

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

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

§ 5.1.7 Retainage

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

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

5%

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

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

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

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

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

§ 5.2 Final Payment

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

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

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

§ 5.3 Interest

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

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

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

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

§ 6.2 Binding Dispute Resolution

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

(Check the appropriate box.)

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

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner’s representative:
(Name, address, email address, and other information)

§ 8.3 The Contractor’s representative:
(Name, address, email address, and other information)

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

§ 8.5 Insurance and Bonds

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

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

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

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

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4

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

- .5 Drawings

Number	Title	Date
--------	-------	------

- .6 Specifications

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

- .7 Addenda, if any:

Number	Date	Pages
--------	------	-------

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:

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

Title **Date** **Pages**

Document **Title** **Date** **Pages**

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

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

OWNER *(Signature)*

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

EXHIBIT A

OLV HUMAN SERVICES (OLV) requires that prior to the commencement of any work, all contractors shall provide a Certificate of Insurance evidencing that liability insurance is currently maintained and in force with an insurance carrier approved to do business in the State of New York and show OLV Certificate Holder. It is our suggestion that you share these requirements with your current insurance agent, broker or insurance company.

Acceptable Certificates of Insurance shall indicate the following minimal coverage limits of insurance, policy numbers and policy effective and expiration dates.

- A. Commercial General Liability:** Contractor and subcontractors shall provide coverage for the named insured's premises & operations, products-completed operations, blanket contractual liability and broad form property damage on an Occurrence basis. General Aggregate must apply separately to each project. Limits expressed shall be no less than:

General Aggregate	\$2,000,000
Products-Completed Operations Aggregate	\$2,000,000
Per Occurrence	\$1,000,000
Personal & Advertising Injury	\$1,000,000
Fire Damage Liability	\$ 100,000
Medical Payment (per person)	\$ 5,000

OLV shall be named as Additional Insured on **ISO Form CG 20 10 11-85 edition or its equivalent** to provide completed operations for the Additional Insured. Such coverage shall apply on a Primary & Non-Contributory basis and be indicated as such on the submitted Certificate of Insurance.

- B.** Any policies effected by the Subcontractor on its Owned and/or Rented Equipment and Materials shall contain a provision requiring the insurance carriers to waive their rights of subrogation against OLV and all other indemnitees named in the Contract.
- C.** Should the Subcontractor engage a Subcontractor, the same conditions will apply under this contract to each Subcontractor, however, the retained Subcontractor shall be required to maintain limits of liability of not less than One Million (\$1,000,000.00) Dollars per occurrence and Two Million (\$2,000,000) for the General Aggregate and Products-Completed Operations Aggregate respectively, with said General Aggregate limits applicable on a per project basis.

D. Workers Compensation & Employers Liability:

Contractors and subcontractors shall provide Workers Compensation insurance as required by statute to cover claims for injury or illness to their employees and those who may be eligible under the Act. Exclusions for proprietors, partners, members of limited liability companies or executive officers will not be permitted.

Workers Compensation:	Statutory
Employers Liability:	
Bodily Injury by Accident (per Accident)	\$100,000
Bodily Injury by Disease (Policy Limit)	\$500,000
Bodily Injury by Disease (Per Employee)	\$100,000

E. Additional Insureds:

In addition to owner, include as additional insureds the following:
Clark Patterson Lee (CPL)

F. Automobile Liability:

Business Auto Liability insurance covering the use of all owned, hired or non-owned autos for Bodily Injury and Property Damage with a Combined Single Limit of \$1,000,000 per Accident. Required limits may be satisfied by a combination of a primary policy and an excess/umbrella policy.

G. Umbrella/Excess Liability:

Commercial Umbrella or excess liability for a limit of at least \$1,000,000 Per Occurrence with a \$1,000,000 Aggregate. Coverage should respond on a follow-form basis and excess over the aforementioned underlying policy limits. Coverage must apply on a primary & noncontributory basis.

H. Indemnification & Defense:

To the fullest extent permitted by law and in compliance with New York General Obligations Law 5-322.1, contractors and their subcontractors will indemnify, defend and hold harmless OLV their officers, directors, partners, representatives, agents and employees from and against any claims, suits, liens, judgments, damages, losses and expenses, including legal fees and all court costs and liability (including statutory liability) arising in whole or in part and in any manner from injury and/or death of person or damage to or loss of any property resulting from the acts, omissions, breach or default of Subcontractor, its officers, directors, agents, employees and subcontractors, directly in connection with the performance of any work by or for Subcontractor, except these claims, suits, liens, judgments, damages, losses and expenses caused by the sole negligence of OLV.

Subcontractor will defend and bear all costs of defending any actions or proceedings brought against OLV its officers, directors, agents and employees, arising in whole or in part out of any such acts, omissions, breach or default as a result of the work performed by the subcontractor.

This indemnification agreement contemplates partial indemnification which is also known as contractual contribution and that partial indemnification is agreed to by the parties to the full extent of non-negligent liability of any of the indemnitees

SECTION 006000 - PROJECT FORMS AND RELATED DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section lists the project forms used for administration of the project as well as documents used for administration and logistics

1.2 FORMS

- A. The following forms are contained within the conditions of the contract section:
1. FRONT END SUBMISSION LOG
 2. PROJECT REQUEST FOR INFORMATION (RFI) FORM
 3. SUBCONTRACTOR LIST
 4. ALLOWANCE DISBURSEMENT FORM
 5. SUBSTITUTION REQUEST FORM
 6. SUBMITTAL COVER
 7. INFORMATION BULLETIN

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROCEDURES

- A. **Front End Submission Log:** This document is a checklist of the required submissions. Refer to Bidding Requirements, Section entitled "Instructions to Bidders" and Division 1, Specification Section entitled "SUBMITTAL PROCEDURES" for submission procedures.
- B. **Project Request For Information (RFI) Form:** This form is to be used for information requests. The forms are filled out by any party to the contract and sent to the Architect/Engineer. The Architect/Engineer shall number RFI before processing.
- C. **Subcontractor List:** This document is to be used identify subcontractors. The forms are filled out by each Prime Contractor for all proposed subcontractors and sent to the Architect/Engineer in accordance with. Division 1, section entitled "SUBMITTAL PROCEDURES"
- D. **Allowance Disbursement Form:** the Architect/Engineer shall issue this document after all parties have agreed to the conditions of change to be charged to the Allowance Amount in accordance with Division 1, section entitled "ALLOWANCES", if required.
- E. **Substitution Request Form:** This document is to be used for a Contractor to propose substitutions. The forms are filled out by each Prime Contractor and sent to the Architect/Engineer in accordance with. Division 1, section entitled "SUBMITTAL PROCEDURES" and "PRODUCT REQUIREMENTS".
- F. **Submittal Cover:** This document is to be used for submittal submissions. The forms are filled out by each Prime Contractor and sent to the Architect/Engineer in accordance with. Division 1, section entitled "SUBMITTAL PROCEDURES"

PROJECT FORMS AND
RELATED DOCUMENTS

- G. **Information Bulletin:** The Architect/Engineer shall issue this document for 3 actions.
1. PROPOSAL REQUEST: A quotations for changes in the Contract Sum and / or proposed modifications to the Contract Documents
 2. SUPPLEMENTAL INSTRUCTIONS: Instructions for changes to the Contract Documents without additional cost or time
 3. CONSTRUCTION CHANGE DIRECTIVE: A directive to immediately proceed with changes to the work of the contract and to submit final cost for inclusion into a Change Order

END OF SECTION 006000



FRONT END SUBMISSION LOG

REV-UP! RENOVATIONS – 16218.00

Contractor Name: _____

SUBMISSIONS

Submission	Date		Remarks
	Submitted	Approved	
Contract:			
Schedule of Values:			
Bonds:			
Insurance:			
Workers Compensation:			
Automobile Insurance:			
Safety Program:			
Schedule:			
Submittal Schedule:			
Emergency Contact:			
Substitution List:			
Subcontractor List:			
Project Manager:			
Superintendent:			

This log is to be used by the contractor to monitor and complete the required front-end submissions.

26 Mississippi St.
Buffalo, NY 14203
CPLteam.com
716-218-4738 TEL

26 Mississippi St.
Buffalo, NY 14203
CPLteam.com
716-218-4738 TEL



REQUEST FOR INFORMATION

RFI #:

Date:

REV-UP! RENOVATIONS – 16218.00

Contractor Name: _____

To: _____ Firm: _____

From: _____

WE REQUEST YOUR ATTENTION (OR CONFIRMATION) REGARDING THE FOLLOWING:

Subject: _____

Location: _____

Information is Requested By: _____

MESSAGE: _____

Contractors Name: _____

By: _____ Date: _____

SUBCONTRACTOR LIST

REV-UP! RENOVATIONS – 16218.00

To: **CPL** From: _____
 26 Mississippi St. (Contractor) _____
 Buffalo, NY 14203 _____

Contractors
 No.: _____

Contract For: _____

List Subcontractors proposed for use on this Project as required by the Construction Documents.
 Attach supplemental sheets if necessary.

Section
 No.: _____ Section Title: _____
 Firm
 Name: _____ Contact: _____
 Address: _____

Section
 No.: _____ Section Title: _____
 Firm
 Name: _____ Contact: _____
 Address: _____

Section
 No.: _____ Section Title: _____
 Firm
 Name: _____ Contact: _____
 Address: _____

Section
 No.: _____ Section Title: _____
 Firm
 Name: _____ Contact: _____
 Address: _____

Section
 No.: _____ Section Title: _____

Attachment(s)

Signed by: _____ Date: _____

Copies: Owner Consultants File

ALLOWANCE DISBURSEMENT AUTHORIZATION

Owner	_____
Architect/Engineer	_____
Contractor	_____
Field	_____
Other	_____
Other	_____

REV-UP! RENOVATIONS – 16218.00

Allowance Disbursement No. _____ Initiation Date: _____

Contract For: _____

To Contractor: _____

Contract Date: _____

Not valid until signed by Owner, Architect/Engineer, [Construction Manager] and Contractor.

The Original Contract Allowance _____

Net Allowance Disbursements previously authorized _____

Charges to Contract Allowance as a result of this authorization _____

Current Contract Allowance Balance including this authorization _____

Owner: _____

Architect/Engineer: _____
(CPL)

Contractor: _____



SUBSTITUTION REQUEST FORM

REV-UP! RENOVATIONS – 16218.00

To: **CPL** From: _____
26 Mississippi St. (Contractor) _____
Buffalo, NY 14203 _____

Re: _____ Substitution Request Number: _____

Contract For: _____

Specification Title: _____ Description: _____

Section Number: _____ Page: _____ Part/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: New product 2-5 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product: _____

Point-by-point comparative data attached

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect/Engineer: _____

Contractor: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: No

Yes, explain _____

Savings to Owner for accepting substitution: _____ (\$ _____)

Proposed substitution changes Contract Time: Yes; explain No Yes [Add] [Deduct] _____ days

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted By: _____

Signed By: _____

Firm: _____

Address _____

Phone: _____

Attachments: _____

REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01330.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed By: _____ Date: _____

Additional

Comments: Contractor Subcontractor Supplier Manufacturer Architect/Engineer

SUBMITTAL COVER

(Attach to each submittal)

#
Submittal No. Contractor only

Architect Project Number: _____

Contractors Number: _____

Project Name: _____

Contractor: _____

Address: _____

Phone / Fax: () _____

Date returned: _____

TYPE OF SUBMITTAL

(Check one)

- | | | |
|--|--|--|
| <input type="checkbox"/> Product Data | <input type="checkbox"/> Color Selection | <input type="checkbox"/> O&M Manual |
| <input type="checkbox"/> Shop Drawings | <input type="checkbox"/> Sample | <input type="checkbox"/> Record Document |
| <input type="checkbox"/> Other | | |

DATE OF SUBMITTAL: _____

RESUBMITTED: _____

NUMBER OF ATTACHED: _____

SUBSTITUTION

See General Conditions

- YES NO

PRODUCT IDENTIFICATION

Specification Section No.: _____

Contract Dwg. No.: _____

Product Name: _____

Part/Paragraph: _____

Detail Reference: _____

Manufacturer: _____

CONTRACTOR APPROVAL

Identify that this submittal has been reviewed and approved by the Contractor in accordance with the General Conditions

By: _____ Date: _____

Deviation from Contract Documents:

Contractor Comments:

<p>FOR USE BY CPL SHOP DRAWING</p> <p> <input type="checkbox"/> No Exception Taken <input type="checkbox"/> Revise & Resubmit <input type="checkbox"/> Furnish as Corrected <input type="checkbox"/> Rejected </p> <p>Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe satisfactory manner.</p> <p>CPL</p> <p>Date: _____ By: _____</p>	<p>Architect's Comments:</p> <div style="border: 1px solid black; height: 80px; margin-bottom: 5px;"></div> <p>RECEIVED STAMP</p>
--	---



INFORMATION BULLETIN

PROJECT: _____ INFORMATION BULLETIN NO.: _____

OWNER: _____ DATE: _____

CONTRACTOR: _____ ARCHITECT'S PROJECT NO.: _____

DESCRIPTION: _____ CONTRACT NO.: _____

CONTRACT DATE: _____

ATTACHMENT(S): _____

A C T I O N

- 1. **PROPOSAL REQUEST:** Submit an itemized quotation for changes in the Contract Sum and/or time required to implement the above proposed modifications to the Contract Documents. This is not authorization to proceed with the work.
- 2. **SUPPLEMENTAL INSTRUCTIONS:** Implement the above instructions without change to the Contract Sum and/or Time. Prior to proceeding, indicate acceptance below and return one copy to the Architect.
- 3. **CONSTRUCTION CHANGE DIRECTIVE:** Proceed with the above described changes to the Contract Documents immediately. Submit final costs and/or change in Contract Time for inclusion in a subsequent Change Order.

Methods: Lump Sum Unit Price Time & Material Not-to-Exceed

Change in Contract Sum of _____

Change in Contract Time of _____ days

ISSUED:

ACCEPTED:

AUTHORIZED:

BY: _____ BY: _____ BY: _____

Architect Date

Contractor Date

Owner Date

-
- Owner
 - Architect
 - Structural
 - Civil
 - Contractor
 - Field
 - Mechanical/Electrical
 - Other (Roofing)

**SECTION 007100
AIA A201 GENERAL CONDITIONS**

PART 1 - GENERAL

1.1 SUMMARY

- A. The following are the “General Conditions of the Contract for Construction,” AIA Document A201-2017, is bound with this Section. AIA Document A201-2017 sets forth the rights, responsibilities, and relationships of the Owner, Contractor, and Architect.

END OF SECTION 007100



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Rev-Up! Renovations
100 Martin Road
Lackawanna, NY 14218

THE OWNER:

(Name, legal status and address)

OLV Human Services
790 Ridge Road
Lackawanna, NY 14218

THE ARCHITECT:

(Name, legal status and address)

CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C.
d/b/a CPL
26 Mississippi Street
Buffalo, NY 14203

TABLE OF ARTICLES

- 1 GENERAL PROVISIONS
- 2 OWNER
- 3 CONTRACTOR
- 4 ARCHITECT
- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS

ADDITIONS AND DELETIONS:

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

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

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

Init.

AIA Document A201® – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. **The "American Institute of Architects," "AIA," the AIA Logo, "A201," and "AIA Contract Documents" are registered trademarks and may not be used without permission.** This document was produced by AIA software at 11:07:12 ET on 04/18/2022 under Order No.2114266488 which expires on 12/10/2022, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes:

(3B9ADA3F)

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



Init.

/

INDEX

(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work

9.6.6, 9.9.3, 12.3

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

Access to Work

3.16, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, 13.4

Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, 15.1.6

Administration of the Contract

3.1.3, 4.2, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

Allowances

3.8

Applications for Payment

4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1

Arbitration

8.3.1, 15.3.2, 15.4

ARCHITECT

4

Architect, Definition of

4.1.1

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

Bonds, Performance, and Payment

7.3.4.4, 9.6.7, 9.10.3, 11.1.2, 11.1.3, 11.5

Building Information Models Use and Reliance

1.8

Building Permit

3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Init.

AIA Document A201® – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A201," and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 11:07:12 ET on 04/18/2022 under Order No.2114266488 which expires on 12/10/2022, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes:

(3B9ADA3F)

Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7,
9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4
Certificates of Inspection, Testing or Approval
13.4.4
Certificates of Insurance
9.10.2
Change Orders
1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,
7.1.2, 7.1.3, 7.2, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,
9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.2, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,
11.5
Claims, Definition of
15.1.1
Claims, Notice of
1.6.2, 15.1.3
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, 15, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, 15.1.5
Claims for Additional Time
3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, 15.1.6
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,
11.3.2, 14.2.4, 15.1.7
Claims Subject to Arbitration
15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,
6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, 15.1.5
Commencement of the Work, Definition of
8.1.2
Communications
3.9.1, 4.2.4
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,
9.10, 12.2, 14.1.2, 15.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,
9.10.3, 12.2, 15.1.2
Compliance with Laws
2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2,
13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3,
15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,
15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY
SEPARATE CONTRACTORS
1.1.4, 6
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3,
7.3, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.4
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR SUSPENSION
OF THE
5.4.1.1, 5.4.2, 11.5, 14
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating
to
3.7.1, 3.10, 5.2, 6.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.3.6, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,
9.1, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,
12.3, 14.2.4, 14.3.2, 15.1.4.2, 15.1.5, 15.2.5
Contract Sum, Definition of
9.1
Contract Time
1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,
7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1,
8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,
14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, 6.1.2
Contractor's Construction and Submittal Schedules
3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2
Contractor's Employees

2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6,
10.2, 10.3, 11.3, 14.1, 14.2.1.1
Contractor's Liability Insurance
11.1
Contractor's Relationship with Separate Contractors
and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2,
9.6.7, 9.10.2, 11.2, 11.3, 11.4
Contractor's Relationship with the Architect
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,
3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2,
6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6,
10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the
Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
2.2.2, 9.7
Contractor's Right to Terminate the Contract
14.1
Contractor's Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2,
9.8.3, 9.9.1, 9.10.2, 9.10.3
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction
Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4,
7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.3.6, 3.11
Copyrights
1.5, 3.17
Correction of Work
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, 12.2, 12.3,
15.1.3.1, 15.1.3.2, 15.2.1
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.4
Costs
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3,
7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6,
11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate
Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2,
11.3, 14.2.4, 15.1.7
Damages for Delay
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4,
7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2,
14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, 9.5, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance,
Rejection and Correction of
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3,
9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1,
6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1
Delays and Extensions of Time
3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7,
10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5
Digital Data Use and Transmission
1.7
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2
Emergencies
10.4, 14.1.1.2, 15.1.5
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2,
10.3.3, 11.3, 14.1, 14.2.1.1
Equipment, Labor, or Materials
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,
4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3,
9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1,
3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1,
9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4
Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2,
10.4, 14.3, 15.1.6, 15.2.5

Failure of Payment
 9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
 Faulty Work
 (See Defective or Nonconforming Work)
 Final Completion and Final Payment
 4.2.1, 4.2.9, 9.8.2, 9.10, 12.3, 14.2.4, 14.4.3
 Financial Arrangements, Owner's
 2.2.1, 13.2.2, 14.1.1.4
GENERAL PROVISIONS
 1
 Governing Law
 13.1
 Guarantees (See Warranty)
 Hazardous Materials and Substances
 10.2.4, 10.3
 Identification of Subcontractors and Suppliers
 5.2.1
 Indemnification
 3.17, 3.18, 9.6.8, 9.10.2, 10.3.3, 11.3
 Information and Services Required of the Owner
 2.1.2, 2.2, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,
 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,
 14.1.1.4, 14.1.4, 15.1.4
 Initial Decision
 15.2
 Initial Decision Maker, Definition of
 1.1.8
 Initial Decision Maker, Decisions
 14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
 Initial Decision Maker, Extent of Authority
 14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
 Injury or Damage to Person or Property
 10.2.8, 10.4
 Inspections
 3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,
 9.9.2, 9.10.1, 12.2.1, 13.4
 Instructions to Bidders
 1.1.1
 Instructions to the Contractor
 3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2
 Instruments of Service, Definition of
 1.1.7
 Insurance
 6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5,
 11
 Insurance, Notice of Cancellation or Expiration
 11.1.4, 11.2.3
 Insurance, Contractor's Liability
 11.1
 Insurance, Effective Date of
 8.2.2, 14.4.2
 Insurance, Owner's Liability
 11.2
 Insurance, Property
 10.2.5, 11.2, 11.4, 11.5
 Insurance, Stored Materials
 9.3.2

INSURANCE AND BONDS
 11
 Insurance Companies, Consent to Partial Occupancy
 9.9.1
 Insured loss, Adjustment and Settlement of
 11.5
 Intent of the Contract Documents
 1.2.1, 4.2.7, 4.2.12, 4.2.13
 Interest
 13.5
 Interpretation
 1.1.8, 1.2.3, 1.4, 4.1.1, 5.1, 6.1.2, 15.1.1
 Interpretations, Written
 4.2.11, 4.2.12
 Judgment on Final Award
 15.4.2
 Labor and Materials, Equipment
 1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,
 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,
 10.2.4, 14.2.1.1, 14.2.1.2
 Labor Disputes
 8.3.1
 Laws and Regulations
 1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,
 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,
 15.4
 Liens
 2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
 Limitations, Statutes of
 12.2.5, 15.1.2, 15.4.1.1
 Limitations of Liability
 3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,
 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,
 11.3, 12.2.5, 13.3.1
 Limitations of Time
 2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,
 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,
 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,
 15.1.2, 15.1.3, 15.1.5
 Materials, Hazardous
 10.2.4, 10.3
 Materials, Labor, Equipment and
 1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,
 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,
 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
 Means, Methods, Techniques, Sequences and
 Procedures of Construction
 3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
 Mechanic's Lien
 2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
 Mediation
 8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, 15.3, 15.4.1,
 15.4.1.1
 Minor Changes in the Work
 1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, 7.4
MISCELLANEOUS PROVISIONS
 13

Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7,
10.3.2
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.6.6, 9.9.3, 12.3
Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4,
12.2
Notice
1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4,
3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4,
8.2.2, 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1,
13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5,
15.1.6, 15.4.1
Notice of Cancellation or Expiration of Insurance
11.1.4, 11.2.3
Notice of Claims
1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, 15.1.3, 15.1.5,
15.1.6, 15.2.8, 15.3.2, 15.4.1
Notice of Testing and Inspections
13.4.1, 13.4.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.3.1, 9.6.6, 9.8
Orders, Written
1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2,
14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Evidence of Financial Arrangements
2.2, 13.2.2, 14.1.1.4
Owner, Information and Services Required of the
2.1.2, 2.2, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5,
9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1,
13.4.2, 14.1.1.4, 14.1.4, 15.1.4
Owner's Authority
1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2,
4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1,
7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2,
10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4,
15.2.7
Owner's Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.5, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award

Separate Contracts
6.1
Owner's Right to Stop the Work
2.4
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2, 14.4
Ownership and Use of Drawings, Specifications and
Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, 1.5, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12,
5.3
Partial Occupancy or Use
9.6.6, 9.9
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1,
14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,
9.10.3, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, 9.10, 12.3, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.4.4, 9.6.7, 9.10.3, 11.1.2
Payments, Progress
9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
7.3.4.4, 9.6.7, 9.10.3, 11.1.2
Permits, Fees, Notices and Compliance with Laws
2.3.1, 3.7, 3.13, 7.3.4.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, 3.12, 4.2.7
Progress and Completion
4.2.2, 8.2, 9.8, 9.9.1, 14.1.4, 15.1.4
Progress Payments
9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4
Project, Definition of
1.1.4
Project Representatives

4.2.10
Property Insurance
10.2.5, 11.2
Proposal Requirements
1.1.1
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1,
10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8,
15.4
Rejection of Work
4.2.6, 12.2.1
Releases and Waivers of Liens
9.3.1, 9.10.2
Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions
by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and
Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and
Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1,
6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2,
12.2.4, 13.3, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, 3.12, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Separate Contractors, Definition of

6.1.1
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, 3.12, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Special Inspections and Testing
4.2.6, 12.2.1, 13.4
Specifications, Definition of
1.1.6
Specifications
1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14
Statute of Limitations
15.1.2, 15.4.1.1
Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4,
9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3,
9.8, 9.9.1, 9.10.2, 9.10.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, 11.3
Substances, Hazardous
10.3
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3,
12.2, 15.1.2
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
2.3.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns

13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4,
7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4
Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6,
9.10.5, 14.2.1
Surety
5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2,
15.2.7
Surety, Consent of
9.8.5, 9.10.2, 9.10.3
Surveys
1.1.7, 2.3.4
Suspension by the Owner for Convenience
14.3
Suspension of the Work
3.7.5, 5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.4.4
Termination by the Contractor
14.1, 15.1.7
Termination by the Owner for Cause
5.4.1.1, 14.2, 15.1.7
Termination by the Owner for Convenience
14.4
Termination of the Architect
2.3.3
Termination of the Contractor Employment
14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT

14
Tests and Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,
9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.4
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7,
10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5
Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2,
5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,
9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14,
15.1.2, 15.1.3, 15.4
Time Limits on Claims
3.7.4, 10.2.8, 15.1.2, 15.1.3
Title to Work
9.3.2, 9.3.3
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 9.1.2
Use of Documents
1.1.1, 1.5, 2.3.6, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.3.2
Waiver of Claims by the Contractor
9.10.5, 13.3.2, 15.1.7
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, 15.1.7
Waiver of Consequential Damages
14.2.4, 15.1.7
Waiver of Liens
9.3, 9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, 11.3
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2,
15.1.2
Weather Delays
8.3, 15.1.6.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3,
13.2, 13.3.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Orders
1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

The Specifications may describe (or the Drawings may show) the general placement required of materials or equipment, but the actual required placement may vary depending on the specific material or equipment used by the Contractor or the existing field conditions. The Contractor shall bear all direct and indirect costs associated with such variances.

Some Specifications may be written in a condensed outline form and omitted words shall be included by inference. If the Specifications identify a task, it shall mean the "Contractor shall furnish, install and complete" the identified task unless otherwise stated.

Reference to standard specifications, manuals or codes shall mean reference to the latest standard specification, manual or code in effect at the time of the execution of the Owner-Contractor Agreement, unless otherwise stated.

When reference is made to a manufacturer, trade association, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) the standards or requirements of such entity shall be incorporated into the Specifications and have the force and effect as though they were set forth expressly. Upon entering into the Owner-Contractor Agreement, the Contractor acknowledges its familiarity with those references, codes, etc. The date of the referenced

standard shall be the latest edition in effect at the time of the execution of the Owner-Contractor Agreement unless otherwise stated.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of inconsistencies within or between parts of the Contract Documents, the Contractor shall (1) provide the better quality of Work or (2) comply with the more stringent requirement; either or both in accordance with the Architect's interpretation. The terms and conditions of the Subparagraph 1.2.1, however shall not relieve the Contractor of any of the obligations set forth elsewhere in this Agreement. All work shall conform to the Contract Documents. No significant change therefrom shall be made without prior written authorization by the Owner. Where only part of the Work is indicated, similar parts shall be considered repetition. When any detail is shown and the components therefore are fully described, similar details shall be construed to require the same materials and construction. Items required by either the Drawings or the Specifications and not mentioned in the other shall be of like effect as if shown or mentioned in both. Should the Specifications and Drawings fail to particularly describe a product or material shown to be used in any place, the Contractor shall furnish the product that would normally be used in that place.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed nor to limit the scope of work performed by any trade or by any Subcontractor or supplier. Such separations shall not operate to make the Architect an arbiter to establish limits of work between Subcontractors or between Contractor and Subcontractor.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 Reference to "match existing" in Contract Documents refer to existing finishes, materials, details, and qualities which have been used in adjacent portions of existing facilities. Material designations or details not specifically shown shall either match existing or be similar in finish, material or quality to similar adjacent conditions.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Owner, Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Owner, Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect’s consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

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

ARTICLE 2 OWNER

§ 2.1 General

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

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

Init.

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

§ 2.2.3

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

§ 2.3 Information and Services Required of the Owner

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

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

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor whose status under the Contract Documents shall be that of the Architect.

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

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

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

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. Such order or stoppage by the Owner shall not constitute grounds for contract termination by the Contractor under Article 14 and shall not be the basis of Time Extensions by the Contractor under Article 8.3.

§ 2.5 Owner's Right to Carry Out the Work

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

§ 2.5.2 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner or Contractor (1) granted in the Contract Documents; (2) law; or (3) in equity.

§ 2.5.3 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work. The owner assumes no responsibility for liability for the safety of the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work; provided that the Owner shall be responsible for, and the Contractor shall upon discovery notify the Owner of, any unsafe condition created by the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

The Contractor shall rely on its own knowledge and its review and interpretation of the Contract Documents and data provided in entering into the Contract and not the representations of the Owner or other persons. The Contractor acknowledges that quantities provided in the Contract Documents are estimates only and Contractor shall not seek additional compensation or adjustment in price based on a variation in actual quantities.

Prior to execution of the Contract, the Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (i) the

Init.

location, condition, layout, and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, and (iv) availability and cost of materials, tools, and equipment.

The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures, and shall not be entitled to any extra payment for discrepancies between the Work as shown in the Contract Documents and existing conditions.

The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. Information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall verify all existing conditions prior to commencing the Work. The Contractor shall make no claim against the Owner or Architect with respect to the accuracy or completeness of such information if the conditions found after commencement of the Work are different from those as indicated.

The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, or over strained, or damaged so as to affect its usefulness, the Contractor shall correct or repair any dislocations, over strains or damages caused.

The Contractor is responsible for restoration and/or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities during the performance of its Work.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

The Contractor shall assume full responsibility for accuracy of measurements obtained at the site. No extra compensation will be allowed because of differences between actual measurements and dimensions indicated on the Drawings, nor for Contractor's failure to coordinate work with actual field measurements.

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

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

§ 3.2.5 The Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the Owner. The Contractor shall report to the Architect whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

Init.

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.3.4 The Contractor shall employ a licensed surveyor to locate and stake out the Work and establish necessary reference and bench marks. The contractor shall work from established bench marks and reference points, layout and correctly establish all lines, levels, grades and locations of all parts of their own Work and be responsible for their accuracy and proper correlation with Work and established data.

§ 3.3.5 Prohibitions: There shall be no use of tobacco products, alcohol or illegal drugs at the construction site. No weapons are permitted at the construction site. Contractor and its agents shall refrain from the use of profanity or dressing in any way that is disrespectful or harassing to legally protected groups, including but not limited to race, color, sex, age, disability, religion, national orientation or sexual orientation.

§ 3.4 Labor and Materials

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

- .1 All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier or distributor, except as otherwise provided in the Contract Documents.
- .2 Contractor shall confine construction equipment, the storage of materials and equipment and the operations of all workers to areas permitted by law, ordinances, permits or the Contract Documents, and shall not disturb the premises more than required for the proper performance of the Work and/or permitted by the Owner.
- .3 Contractors and Subcontractors warrant that they have good title to all materials used in performing Work on this Contract.

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

After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only if the Contractor satisfies the procedural requirements set forth in the General Requirements (Division 01) of the Specifications. By making requests for substitutions, the Contractor:

- .1 Represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 Represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

Init.

- .3 Certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that may subsequently be incurred by the Contractor; and
- .4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 3.4.2.1 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed upon changes in the Drawings and Specifications resulting from such substitutions. The Owner may seek reimbursement pursuant to the procedures set forth in **§ 9.5.1**.

§ 3.4.2.2 The Contractor shall bear all expenses resulting from substitutions including the cost General Conditions as well as any structural, plumbing, mechanical and electrical trade costs made necessary by the substitution.

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

§ 3.4.4 The Owner shall have the right, but not the obligation, to require the Contractor to remove and replace, with a person acceptable to Owner, promptly after notice from Owner, any employee of Contractor or Subcontractor who:
(1) has engaged in conduct on Owner's property that is contrary to the requirements of any applicable law, the Contract Documents, or any rule or directive of Owner relating to conduct on Owner's property; or (2) is incapable of fulfilling its responsibilities in connection with the Project.

§ 3.5 Warranty

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

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

**SECTION 011000
SUMMARY**

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Project Information.
 - 2. Work Covered by Contract Documents.
 - 3. Access to Site.
 - 4. Work Restrictions.
 - 5. Coordination with Occupants.
 - 6. Work Under Separate Contracts.
 - 7. Work Performed by the Owner.
 - 8. Specification and Drawing Conventions.
- B. Related Sections:
 - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

- A. Project Identification:
- B. Project Location:
 - 1. 100 Martin Rd.
Lackawanna, NY 14218
- C. Owner: OLV Human Services: 790 Ridge Rd..
 - 1. Owner's Representative: Karen Ralph-Langdon, Chief Facilities and Procurement Officer .
- D. Architect: CPL, Buffalo: 26 Mississippi Street, Suite 100, Buffalo, NY 14203.
 - 1. Contact Person(s):
 - a. Project Manager: Michelle Ezzo PH: 716-220-3492.
- E. Submittal Web Site: The Architect requires the use of Newforma Info Exchange for delivery and return of submittals, shop drawings and requests for information. There are **no exceptions** to this requirement.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. Minor sitework to create handicapped accessible ramps, interior renovations including metal stud and gypsum, casework, finishes, plumbing, fire protection, mechanical and electrical work.
- B. Type of Contract:
 - 1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

- A. Use of Site: Limit use of Project site to work 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 storage of materials.
 - a. 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.

1.5 WORK RESTRICTIONS

- A. General Work Restrictions: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building and/or the existing site to normal business working hours of 7:00 am to 5:00 pm, Monday through Friday, except as otherwise indicated.
 - 1. Weekend Hours: Work may occur at any times, as approved.
 - 2. Hours for Noisy Activity: For core drilling, powder-activated fasteners, and other disruptive activities, 7:00 am to 10:00 pm , or as otherwise approved.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than (2) two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than days in advance of proposed disruptive operations.
 - 2. Obtain Architect's and Owner's written permission before proceeding with disruptive operations.

1.6 COORDINATION WITH OCCUPANTS

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

1.7 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. **Concurrent Work:** Owner will award separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
 - 1. Asbestos Flooring Abatement

2. Floor Finish Installation in areas indicated on contract documents.

1.8 WORK PERFORMED BY THE OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
 1. **Concurrent Work:** Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
 - a. Demolition, furring walls, painting, installation of casework, suspended acoustic ceiling and light fixtures in areas designated on drawings.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

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

OLV HUMAN SERVICES
16128.00

SUMMARY

REV-UP! RENOVATIONS
011000 - 4

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 011000

This page intentionally left blank

**SECTION 012100
ALLOWANCES**

PART 1 GENERAL

1.1 SUMMARY

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

1.2 SELECTION AND PURCHASE

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

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work.
- B. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include delivery to Project site.
- C. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to the work ordered by Owner under the allowance shall be included as part of the Contract Sum and not part of the allowance.

1.6 LUMP-SUM ALLOWANCES

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

1.7 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, for work ordered by Owner under the contingency allowance is included in the Contract Sum and is not part of the Allowance.
- C. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.8 ADJUSTMENT OF ALLOWANCES (QUANTITY AND / OR UNIT COST)

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount indicated in the allowance.
- B. Submit claims for increased costs because of a change in scope as described in the Contract Documents, whether for the quantity amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PREPARATION

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

3.2 GENERAL CONSTRUCTION SCHEDULE OF ALLOWANCES

- A. GC-1: Contingency Allowance: Include in the Base Bid an Allowance of **\$ 10, 000** for use according to the Owners instructions."
 - 1. Contractor overhead and profit is provided in the Base Bid.
- B. GC-2: Lump Sum Allowance: Include the sum of \$30,000 for National Grid Fees associated with upgrade to electrical service.
- C. GC-3: Lump Sum Allowance: Include the sum of \$5,000 for hardware and electrical devices and wiring as required to provide a fully operational access controlled door at the new main entrance, door C1. Coordinate with Owner's access control vendor - Casco. Contact Wally Carriero-716-481-1037.

END OF SECTION 012100

This page intentionally left blank

**SECTION 012300
ALTERNATES**

PART 1 GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

1.3 PROCEDURES

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

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. ALL TRADES:

1. **Alternate No. -1: Storage cabinets and sink.**
 - a. **Base Bid:** No wall cabinets in Yoga/ Dance Studio Rm. 2 as indicated on Sheet A200, First Floor Plan, Interior Elevation 12. No wall and base cabinets and sink in Maker Space Rm. 25 as indicated on Sheet A200, First Floor Plan, Interior Elevation 6 and Sheet P301, First Floor Domestic Piping Plan.
 - b. **Alternate: Add** wall cabinets in Yoga/ Dance Studio Rm. 2 as indicated on Sheet A200, First Floor Plan, Interior Elevation 12. **Add** wall and base cabinets and sink in Maker Space Rm. 25 as indicated on Sheet A200, First Floor Plan, Interior Elevation 6 and Sheet P301, First Floor Domestic Piping Plan.
2. **Alternate No. -2: Replace wood paneling.**
 - a. **Base Bid:** Existing wood paneling on exterior walls of Yoga/Dance Studio Rm. 2, Closet 4, Staff Office 28 and Staff Office 29 to remain.
 - b. **Alternate:** Existing wood paneling, furring and insulation on exterior walls of Yoga/Dance Studio Rm. 2, Closet 4, Staff Office 28 and Staff Office 29 to be removed and replaced with Partition Type F2i as shown on Sheet A800. Trim at windows with J-mold. Provide extensions and rework all existing outlets and devices mounted on exterior walls.

Paint drywall and install new rubber base as scheduled on Sheets I000 and I200.

3. **Alternate No. -3: Finned Tube Enclosures.**
 - a. **Base Bid:** Existing Covers to remain in Rooms where no alteration is required.
 - b. **Alternate:** Remove existing fin tube enclosures. Install new enclosures as indicated on Sheets H101 and H201.
4. **Alternate No. -4: Offices and Music Therapy .**
 - a. **Base Bid:** No new flooring, base, paint, acoustic ceiling panels and light fixtures in existing Office 5, Music Therapy 9 and Staff Office 28, as indicated on Sheet A200, First Floor Plan,
 - b. **Alternate:** Install new flooring, base, wall paint, acoustic ceiling panels and light fixtures in existing Office 5, Music Therapy 9 and Staff Office 28 as indicated on Sheet A200, A601, I000, I200 and E301.
5. **Alternate No. -5: Mechanical Closet 3**
 - a. **Base Bid:** Existing enclosure partitions for Mechanical Closet 3 to remain,
 - b. **Alternate:** Demolish existing CMU Partitions. Install new partitions as shown on Sheet A200. Paint exterior as scheduled on Sheet I200.

END OF SECTION 012300

**SECTION 012500
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.1 GENERAL

- A. Should the Contractor desire to substitute other articles, materials, apparatus, products or processes than those specified or approved as equal, the Contractor shall apply to the Architect in writing for approval of such substitution. It should be noted that the bid shall not be based on a substituted article, material, apparatus, product or process. With the application shall be furnished such information as required by the Architect to demonstrate that the article, material, apparatus, product or process he wishes to use is the equivalent of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended. The Contractor shall set forth the reasons for desiring to make the substitution and shall further state what difference, if any, will be made in the construction schedule and the contract price for such substitution should it be accepted; it being the intent hereunder that any savings shall accrue to the benefit of the Owner.
- B. The Architect shall reject any such desired substitution as not being specifically named in the contract, or if he shall determine that the adjustment in price in favor of the Owner is insufficient, the Contractor shall immediately proceed to furnish the designated article, material, apparatus, product or process.
- C. Request for substitutes shall conform to the requirements of this Article.
- D. Requests for substitutions shall, include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the Owner.
- E. Requests for utilization of substitutes will be reviewed during the course of the project. The impact on the project and the timeliness of submission will be of key consideration.
- F. The approval of utilization of a substitute is subject to the sole and final discretion of the Architect.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Alternates" for products selected under an alternate.
 - 3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 4. Division 01 Section "Submittals" for submittal procedures.
 - 5. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

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

- B. Substitute Items (Or Equal): If in Architect/Engineer's sole discretion, an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item it will be considered a proposed substitute item.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable: Substitution Request Form: Use the Substitution Request Form bound into section 006000 of this Project Manual.
 - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
 - b. Coordination 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 substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with current building code in effect for Project, from Building Code of New York State.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - n. See additional requirements in Article 2.3 DETAILED SUBSTITUTION REVIEW PROCEDURES.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within (5) five days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within (10) ten days of receipt of request, or (5) five 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.

1.5 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.1 SUBSTITUTION PROCEDURES (GENERAL)

- A. Conditions: After the "Notice of Award" and prior to the Contractor entering into a Formal Contract with the Owner, the 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 is consistent with the Contract Documents and will produce indicated results.
 2. Substitution results in substantial cost savings to the Owner or substantial performance improvements.
 3. Substitution request is fully documented and properly submitted.
 4. Requested substitution will not adversely affect Contractor's construction schedule.
 5. Requested substitution has received necessary approvals of authorities having jurisdiction.
 6. Requested substitution is compatible with other portions of the Work.
 7. Requested substitution has been coordinated with other portions of the Work.
 8. Requested substitution provides specified warranty.
 9. 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.
 10. The substitution is submitted in compliance with Article 2.3 DETAILED SUBSTITUTION REVIEW PROCEDURES.
- B. If the Contractor does not present "Substitutions" in the time frame noted above any future requests to substitute products will not be considered, unless the substitution is for cause.
- C. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

2.2 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than (20) twenty days prior to time required for preparation and review of related submittals.
 1. Architect will consider Contractor's request for substitution when the following conditions are present.
 - a. The specified product is not available
 - b. The specified product cannot be delivered in the time frame required under the Project Schedule.
 2. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received prior to award of contract and based on the following:
1. The proposed product substitution will result in a significant cost savings to the Owner.
 2. The proposed product has substantial performance improvements.
 3. The proposed product can be provided much earlier in the schedule enhancing the project completion date.
 4. The proposed product warranty is superior to the specified item.

2.3 DETAILED SUBSTITUTION REVIEW PROCEDURES

- A. The Architect in addition to the requirements listed above will require compliance with the following requirements and procedures.
1. Requests for approval of substitutions will be received and considered from Prime Contractors only and not from manufacturers, suppliers, Subcontractors, or other third parties.
 2. If the materials and equipment submitted are offered as substitutions to the Contract Documents or approved equal, the Contractor shall advise the Owner and the Architect of the requested substitutions and comply with the requirements hereinafter specified in this Article.
 3. Where the acceptability of substitution is conditioned upon a record of and the proposed substitution does not fulfill this requirement, the Architect, at the Architect's sole discretion, may accept the substitution if the Contractor provides a bond or cash deposit which guarantees replacement at no cost to the Owner for any failure occurring within a specified time. The substitution item must meet all other technical requirements contained in the Specification.
 4. The Contractor shall furnish such information as required by the Architect to demonstrate that the equal article, material, apparatus, product or process is the equivalent of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended and/or that it offers substantial benefits to the Owner in saving of time and/or cost. The Contractor shall set forth the reasons for desiring to make this substitution.
 5. Contractor shall submit:
 - a. For each proposed request for approved substitute sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the Architect to determine if the proposed request for approval should be granted, including manufacturer's brand or trade names, model numbers, description of specification of item, performance data, test reports, samples, history of service, and other data as applicable.
 - b. Certified tests, where applicable, by an independent laboratory attesting to the performance of the substitute.
 - c. A list of installations where the proposed substitute equipment or materials is performing under similar conditions as specified.

- d. A list of installations where the proposed substitute equipment or materials is performing under similar conditions as specified.
6. Where the approval of a substitute requires revision or redesign of any part of Work, including that of other Contracts, all such revision and redesign, and all new drawings and details required therefore, shall be provided by the Contractor at its own cost and expense, and shall be subject to the approval of the Architect.
7. In the event that the Architect is required to provide additional services, then the Architect's charges for such additional services shall be paid by the Contractor to the Owner.
8. Any modifications in the Work required under other contracts to accommodate the changed design will be incorporated in the appropriate contracts and any resulting increases in contract prices will be charged to the Contractor by the Owner who initiated the changed design.
9. In all cases, the Architect shall be the judge as to whether a proposed substitute is to be approved. The Contractor shall be bound by the Architect's decision. No substitute items shall be used in the Work without written approval of the Architect.
10. In making request for approval of substitute, Contractor represents that:
 - a. Contractor has investigated proposed substitute and determined that it is equal to or superior in all respects to the product, manufacturer or method specified or offers other specified advantages to the Owner.
 - b. Contractor will provide the same or better warranties or bonds for proposed substitute as for product, manufacturer or method specified.
 - c. Contractor waives all claims for additional costs or extension of time related to proposed substitute that subsequently may become apparent.
 - d. Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Architect in considering a substitute proposed by the Contractor or by reason of failure of the Architect to approve a substitute proposed by the Contractor. Any delays arising out of consideration, approval, or utilization of a substitute shall be the sole responsibility of the Contractor requesting the substitute and it shall arrange its operations to make up the time lost.
11. Proposed substitute will not be accepted if:
 - a. Acceptance will require substantial revision of Contract Documents.
 - b. Acceptance will substantially change design concepts or Technical Specifications.
 - c. Acceptance will delay completion of the Work, or the Work of other Contractors.
 - d. If the Substitute item is not accompanied by formal request for approval of substitute from Contractor.
12. The Architect reserves the right to disapprove, for aesthetic reasons, any material or equipment on the basis of design or color considerations alone, without prejudice to the quality of the material or equipment, if the manufacturer cannot meet the required colors or design.
13. All requests for approval of substitutes of materials or other changes from the contract requirements shall be accompanied by an itemized list of all other items affected by such substitution or change. The Architect shall have the right, if such is not done, to rescind any approvals for substitutions and to order such Work removed and replaced with Work conforming to the specified requirements of the contract, all at the Contractor's expense, or to assess all additional costs resulting from the substitution to the Contractor.
14. Approval of a substitute will not relieve Contractor from the requirement to submit Shop Drawings or any of the provisions of the Contract Documents.
15. In the event that the Architect is required to provide additional services as a result of a request for approval of a substitute results in changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or as a result of Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents or if the Architect is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, or for evaluation of deviations from Contract

Documents, then the Architect's charges in connection with such additional services shall be paid by the Contractor.

16. Structural design shown on the Drawings is based upon the configuration of and maximum loading for major items of equipment as indicated on the Drawings and as specified. If the substituted equipment furnished differs from said features, the Contractor shall pay to the Owner all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the Architect's charges in connection therewith.
- B. The Contractor shall respond to required submittals with complete information and with a degree of accuracy to achieve approvals within two (2) submissions. All costs to the Architect involved with subsequent submissions of Shop Drawings, Samples or other items requiring approval, will be paid by the Contractor to the Owner, by deducting such costs from payments due for Work completed. In the event an approved item is requested by the Contractor to be changed or substituted for, all costs involved in the reviewing and approval process will likewise be back charged to the Contractor unless determined by the Architect that the need for such substitution and/or deviation from Contract Documents is beyond the control of the Contractor.

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 012500

**SECTION 012600
CONTRACT MODIFICATION PROCEDURES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
 - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.2 NO COST CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on the Information Bulletin form bound in section 006000 of this Project Manual.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or (10) ten days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship.
- 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.

6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within (5) five days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than (5) five days after such authorization.
 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Adjustment from Allowances: Refer to Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Adjustments from Unit Prices: Refer to Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on the Information Bulletin form bound in section 006000 of this Project Manual.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on the Information Bulletin form bound in section 006000 of this Project Manual.
 1. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - a. 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

OLV HUMAN SERVICES

16128.00

CONTRACT MODIFICATION
PROCEDURES

REV-UP! RENOVATIONS

012600 - 3

Contract Time.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 012600

This page intentionally left blank

**SECTION 012900
PAYMENT PROCEDURES**

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 01 Section "Allowances" for requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for procedures for handling changes to the Contract.
 - 3. Division 01 Section "Construction Progress Documentation" for requirements governing the preparation and submittal of the Contractor's construction schedule.
 - 4. Division 01 Section "Submittal Procedures" for requirements governing the preparation and submittal of the submittal schedule.

1.2 SCHEDULE OF VALUES

- A. Schedule of Values: Furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- B. Coordination: Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - 1. Application for Payment forms AIA G702 and G703 with continuation sheets.
 - 2. Submittal schedule.
 - 3. Submit the schedule of values to Architect at earliest possible date but no later than (7) seven days before the date scheduled for submittal of initial Applications for Payment.
- C. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.
 - 4. The following line items must be included on the continuation sheet.
 - a. Project Bonds and Insurances.

- b. Mobilization.
 - c. Shop Drawings.
 - d. Project Meetings.
 - e. Temporary Heat (where applicable).
 - f. Progress Cleaning.
 - g. Lawn and Tree Watering (where applicable to establish new lawns and trees).
 - h. Punch List.
 - i. Final Cleaning.
 - j. Close Out documents and Warranties.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Submit draft of AIA Document G703 Continuation Sheets.
 7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Architect by the last day 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 (5) five days prior to due date for review by Architect. (Work to be projected out to the end of the pay period).
- C. Application for Payment Forms: Use AIA Documents G702 and G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. 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. The OWNER shall retain (5%) five percent of the amount due on each Application for both the work completed and materials stored. The OWNER reserves the right to retain a greater percentage in the event the CONTRACTOR fails to make satisfactory progress or in the event there is other specific cause for greater withholding.
- E. 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.
- F. Transmittal: Submit (4) four 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.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede submittal of first Application for Payment include the following:
1. List of Substitutions
 2. Contract or Notice to Proceed.
 3. Performance and Payment bonds.
 4. Liability, Auto, and Umbrella Insurance
 5. Worker Compensation certificates
 6. Proposed schedule of values for approval.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
 - c. Record Drawings and Specifications.
 - d. Operations and Maintenance Manuals.
 - e. Maintenance Instructions and Training.
 - f. Start-up performance reports.
 - g. Test/adjust/balance records.
 - h. Warranties (guarantees) and maintenance agreements.
 - i. Final cleaning.
 - j. Change-over information related to Owner's occupancy, use, operation and maintenance.
 - k. Application for reduction of retainage and consent of surety.
 - l. Advice on shifting insurance coverages.
 2. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 3. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Ensure that incomplete Work is not accepted and will be completed without undue delay.
2. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
3. Evidence of completion of Project closeout requirements.
4. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
5. Updated final statement, accounting for final changes to the Contract Sum.
6. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
7. AIA Document G707, "Consent of Surety to Final Payment."
8. Evidence that all claims have been settled.
9. Removal of temporary facilities and services.
10. Removal of surplus materials, rubbish, and similar elements.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 012900

**SECTION 013100
PROJECT MANAGEMENT AND COORDINATION****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
 - 4. Requests for Information (RFIs).
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Sections:
 - 1. Division 01 Section " Summary" for Project Information and phasing requirements
 - 2. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 3. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 4. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.
 - 5. Division 01 Section "General Commissioning Requirements" for coordinating the Work with Owner's commissioning authority.

1.2 DEFINITIONS

- A. RFI: Request from Owner, [Construction Manager,] Architect, or Contractor seeking information from each other during construction.

1.3 INFORMATIONAL SUBMITTALS

- A. Use the Architects Newforma Info Exchange when up loading Submittals.
- B. Subcontract list is required by AIA Document A201 to be submitted as soon as practical prior to award of the Contract. Coordinate with submittal requirements for subcontract list in Procurement Requirements and Contracting Requirements if any.
- C. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, 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. Each Contractor to furnish a 24hr. emergency contact person and cellular phone number.

1.4 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors, to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. Project closeout activities.

1.5 REQUESTS FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Do not submit an RFI if information is readily available in the contract documents. Verify by contacting and questioning the Architect prior to submitting an RFI.
 - a. Architect will return with no response RFI's where information is available to the contractor as indicated on the Contract Documents.
 2. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect].
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI's sent without the required content information will not be considered a formal RFI.

- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow **seven** working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be refused without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within **10** 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 **weekly**. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect .
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work 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 **seven** days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.6 ARCHITECTS WEBSITE

- A. The contractor will use Newforma Info Exchange for Submittals, Shop Drawings and RFI's Project Web site shall include the following functions:
1. Project directory.
 2. Project correspondence.
 3. Meeting minutes.
 4. Contract modifications forms and logs.
 5. RFI forms and logs.
 6. Task and issue management.
 7. Photo documentation.
 8. Schedule and calendar management.

9. Submittals forms and logs.
10. Payment application forms.
11. Drawing and specification document hosting, viewing, and updating.
12. Online document collaboration.
13. Reminder and tracking functions.
14. Archiving functions.

1.7 PROJECT MEETINGS

- A. General: Architect will 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. All Prime Contractors are required to attend Project Meetings.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, and Architect, within **three** days of the meeting.
- B. Preconstruction Conference: **Architect will schedule and conduct** a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractors and their superintendents; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to decide matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for project communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Testing and inspecting requirements.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures using Newforma Info Exchange.
 - l. Preparation and updating of record documents.
 - m. Use of the premises .
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements and restrictions.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.

- x. First aid.
 - y. Security.
 - z. Progress cleaning.
 - 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Progress Meetings: **Architect will conduct will conduct]** progress meetings at **regular** intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Required Attendees: In addition to representatives of Owner and Architect, each Prime 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 decide 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 utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Status of correction of deficient items.
 - 11) Field observations.
 - 12) Status of RFIs.
 - 13) Status of proposal requests.
 - 14) Pending changes.
 - 15) Status of Change Orders.
 - 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 APPLICABLE)**PART 3 EXECUTION (NOT APPLICABLE)****END OF SECTION**

This page intentionally left blank

**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. Start-up construction schedule.
 2. Contractor's construction schedule.
 3. Daily construction reports.
 4. Field condition reports.
 5. Special reports.

1.2 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format(s):
1. Electronic PDF files.
- B. Start-up construction schedule.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- D. Field Condition Reports: Submit at time of discovery of differing conditions.
- E. Special Reports: Submit at time of unusual event.

1.3 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination". Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss area separations, project and interim milestones, and Work by Owner.
 4. Review delivery dates for Owner-furnished products.
 5. Review schedule for work of Owner's separate contracts.
 6. Review time required for review of submittals and resubmittals.
 7. Review time required for completion and startup procedures.
 8. Review and finalize list of construction activities to be included in schedule.
 9. Review submittal requirements and procedures.
 10. Review procedures for updating schedule.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 PRODUCTS**2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
- B. Schedule 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 by Owner: Include a separate activity for each portion of the Work performed by Owner.
 2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "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. Uninterruptible services.
 - c. Partial occupancy before Substantial Completion.
 - d. Use of premises restrictions.
 - e. Provisions for future construction.
 - f. Seasonal variations.
 - g. 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. Submittals.
 - b. Purchases.
 - c. Sample testing.
 - d. Deliveries.
 - e. Installation.
 - f. Tests and inspections.
 - g. Adjusting.
 - h. Startup and placement into final use and operation.
- C. 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 RFI's.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
- D. Recovery Schedule: When periodic update indicates the Work is (14) fourteen or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- E. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type construction schedule within (7) seven days of date established for approval. Schedule to start from the Notice of Award.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: From the approved Bar Chart Schedule submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within (30) thirty days Base schedule on the approved startup construction schedule and additional information received since the start of Project.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of Prime contractors at Project site.
 2. List of subcontractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

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

PART 3 EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Owner, Architect, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. This specification describes the procedures for submission of submittals and shop drawings using Newforma Info Exchange.
 - 1. The Contractor will be required to use the Newforma Info Exchange for the transfer of Submittals, Shop Drawings and RFI's. There will be **no exceptions** to this requirement. The contractor will be given a login and password free of charge. For more information follow the procedure below.
 - a. Information and instructions for use are available for review by the Contractor by contacting CPL. The Contractor is to provide an email address for the file to be sent. A PDF file will be emailed to the requesting contractor.

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".
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.4 SUBMITTAL GENERAL ADMINISTRATIVE REQUIREMENTS

- A. The Contractor shall prepare a Submittal Log containing the information required to be submitted under the Submittal article from each respective Specification Section. With each item listed the Contractor shall provide anticipated dates for submission to the Architect. The Architect will

review and accept or request that corrections be made for subsequent acceptance. This acceptance will constitute an approval for the submittal, shop drawings and sample submissions to commence.

No Submittals or Shop Drawings will be reviewed by the Architect until an approved Submittal Schedule is in place.

- B. The contractor shall prepare expected submittals in Newforma that correspond to all submittals listed on the submittal schedule at the time of submission of the submittal log. These expected submittals are to follow the naming conventions laid out in section “1.5 Submittal Schedule” and “1.6 Submittal Identification”.
- C. The Contractor is responsible for all costs for creating electronic files for the submittal process. The Architect will not provide this service.
1. The Submittal Cover Sheet located in Specification Section 006000 Project Forms shall be used for all Submittals.
 - a. An electronic form of the submittal cover is available upon request from the Architect.
 2. The Submittal Cover sheet when scanned to a PDF shall be the first page viewed in the individual file.
 - a. Each product submitted within a specification section shall have a Submittal Cover sheet attached. Combined submittals with one cover page will not be accepted
 - b. Each Submittal Cover sheet shall be filled in completely. **Files that are sent with the Submittal Cover Sheet missing or not filled in correctly will not be reviewed.** The Architect will send a notice that the submittal is missing information. If the Contractor fails to correct or provide the proper submittal within (15) fifteen days, notice will be provided, and the submittal will be REJECTED.
 3. The Contractor(s) will be provided with a link to upload files to the Newforma Info Exchange. The site address and a “log in” will be provided to the Contractor(s) free of charge.
 4. A read-only Record Submittal Log and RFI Log will be available from the Newforma Info Exchange for the Contractor's reference in checking the status of the submittals and shop drawings.
- D. 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 transmittals of different types of submittals from related sections for parts of the work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received. Delays associated with the above are not the Architects responsibility and rests solely with the Contractor.

1.5 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. Submit a preliminary, if not final, Submittal Schedule for approval a minimum of (15) fifteen days after award of contract. Failure to submit a submittal schedule within the required time

frame will result in the refusal by the Architect to review any submittals. Delays associated with failure to receive the Submittal Schedule are not the Architect's responsibly and rest solely with the Contractor.

- B. The information is required to be submitted under the Submittal article from each respective Specification Section. With each item listed, the Contractor shall provide anticipated dates for submission to the Architect. The Architect will review and accept or request that corrections be made for subsequent acceptance. This acceptance will constitute a review for the submittal, shop drawings and sample submissions may commence. No Submittals or Shop Drawings will be reviewed by the Architect until an approved Submittal Schedule is in place.
1. The Submittal Schedule shall be coordinated with the overall Project Schedule to ensure that submittals are submitted and reviewed so as not to delay the Project Schedule.
 2. The Architect will not be responsible for ensuring that all required Shop Drawings, Product Data, Samples or similar submittals that are required to be submitted and reviewed under the Contract Documents are submitted by the Contractor. Submissions of Shop Drawings, Product Data, Samples or similar submittals are the Contractor's sole responsibility. Delays associated with the Contractor's failure to provide the required submittals are the Contractor's responsibility.
 3. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 4. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first (30) thirty days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 5. 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.
 6. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.

1.6 SUBMITTAL IDENTIFICATION

- A. Submittal Cover Sheet: Attach one cover sheet for each product, shop drawing or sample. **DO NOT** combine submittals together with one cover sheet for multiple items. They will not be reviewed.
- B. Submittal Information: Include the following information in each submittal. Use the submittal cover form found in specification section 006000 Project Forms. An electronic form can be sent to the contractor upon request.
1. Contractor, Address, Phone/fax and or Email
 2. Contractors Submittal Number.
 3. Architects Project Number (if not filled in by the Architect).
 4. Project Name (if not filled in by the Architect).

5. Type of submittal being sent (select box).
 6. Product Identification including the following: Provide one submittal cover sheet for each product within a specification section.
 - a. Specification Section Number.
 - b. Contract Drawing Number.
 - c. Product Name.
 - d. Specification Reference: Part/Paragraph.
 - e. Detail Reference.
 - f. Manufacturer.
 7. Contractors Approval: The contractor must acknowledge that they have reviewed the submittal for conformance with the Contract Documents and must sign and date the approval.
 8. Deviation from the Contract Documents: Where the submittal may not meet all of the requirements of the specified item. The contractor must indicate how the submitted item differs from the specified item.
 9. Contractor Comments: Any additional comments by the contractor should be indicated in this space. (Provide an attachment sheet for any other information required that will not fit on the cover sheet).
- C. Deviations and Additional Information: On each individual submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information, revisions, line by line comparison and other information requested by Architect. Indicate by highlighting on each submittal or noting on attached separate sheet. Identify options requiring selection by Architect.
- D. File Naming (for uploading to Newforma Info Exchange): Each submittal or shop drawing file uploaded to the project on the Newforma Info Exchange, shall have in the file name, the specification section number followed by the submittal number, the submittal abbreviation and the specification section name. For re-submissions an R1 would be added following submittal number. The file name must include the following information:
- E. When uploading submittals or RFI's to the Newforma Info Exchange, complete the online transmittal. The information required is derived from the Contractor's submittal cover sheet or RFI. Instructions for using the Newforma Info Exchange are available from CPL. These instructions can be emailed to the contractor.

1.7 SUBMITTAL DATA AND TESTING REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment. Each product within a specification section shall have a separate submittal cover.
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. Send full submittals for each product. Partial submittals will not be reviewed until all required submittal information is received. The Architect will not be responsible for project delays due to the Contractor's failure to submit the required submittal information in a complete package.
 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 for each shop drawing. 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. Description any conflicts with other trades.
 - h. 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. If samples are delivered with product data, only the samples will be reviewed. The Product Data must be uploaded to the Newforma Info Exchange. A duplicate submittal cover sheet is to be uploaded to the Newforma Info Exchange as a record of sample delivery.
 - a. The Product Data is to be loaded concurrent with the delivery of samples. Samples may be delivered/given to the Architect. In the remarks column of the transmittal place "given to the Architect".
 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.
 - g. In addition to all hard copy and physical samples submitted, duplicate digital submittal is to be produced for review, record and tracking purposes through Newforma Info Exchange. Include same information as above as well as a high resolution, color, digital image of all samples with labeled information clearly visible for each physical sample.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: 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 (1) 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.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit (3) three sets of Samples. Architect will retain (2) 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 (3) three sets of paired units that show approximate limits of variations.
- D. Information requirements for each submittal: Where submittal is requiring Schedules, Product Data, Qualification Data, Design Data, Certificates and Tests use the following protocol.
1. Schedules: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 2. Product Data: Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - a. Manufacturer and product name, and model number if applicable.
 - b. Number and name of room or space.
 - c. Location within room or space.
 3. 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.
 4. 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.
 5. Certificates:
 - a. 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.
 - b. Insert definition of Contractor certificates here if required by individual Specification Sections. See the Evaluations.
 - c. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

- d. 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.
 - e. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 - f. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 - g. 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.
 - h. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 - i. 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.
 - j. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 - k. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
6. Test and Research Reports:
- a. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 - b. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 - c. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 - d. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 - e. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 - f. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1) Name of evaluation organization.
 - 2) Date of evaluation.
 - 3) Time period when report is in effect.
 - 4) Product and manufacturers' names.
 - 5) Description of product.
 - 6) Test procedures and results.
 - 7) Limitations of use.
- E. Submit the following submittals: Within (15) fifteen days of contract award.
1. Submittal Schedule including dates of anticipated review and approval.

- a. No submittals will be reviewed without an approved Submittal Schedule in place.
 2. Subcontractor List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - a. Name, address, telephone number and email address of entities performing subcontract or supplying products.
 - b. Number and title of related Specification Section(s) covered by subcontract.
 3. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation".
 4. Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures".
- F. Submit with in the first (30) thirty days after Contract Award
1. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014329 "Special Inspections".
 2. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 3. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- G. Submit Field Test Reports during construction within (15) fifteen days of the testing date and as follows:
1. Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- H. Submit a minimum (30) thirty days prior to Project Closeout:
1. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures".
 2. Maintenance Data: Comply with requirements specified in Division 01 Section 017823 "Operation and Maintenance Data".

1.8 SUBMITTAL PROCESSING

- A. Processing Time: Allow time for submittal review, including time for re-submittals, 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 re-submittals.
- B. The architect will not be responsible for project delays due to the contractor's failure to submit the required submittal information in time to allow for review based on the stipulated review time and to meet the project schedule.
- C. Initial Review: Allow (10) ten Calendar 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.
- D. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
- E. Re-submittal Review: Allow (10) ten Calendar days for review of each re-submittal.
- F. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow (21) twenty-one Calendar days for initial review of each submittal.

- G. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow (15) fifteen Calendar days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- H. Where submittal are required to be approved that are part of an assembly or for items such as finishes where color selections are required. The submittal will be retained until all of the information related to these systems and color selections is provided and accepted.
- I. Products with multiple submittals may be held until all necessary information has been submitted for architect to make a complete review. Submittals dependent on coordinating information from related or dependent products; or products with critical interface with other products may be held until all information is submitted for architect to make a complete review and coordinate all required information. EXAMPLE: door frames will not be reviewed without door hardware.
- J. 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 reviewed notation from Architect's action stamp.
- K. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

1.9 SUBMITTAL PROCEDURES

- A. 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.
- B. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- C. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- D. 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.
- E. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- F. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- G. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- H. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on

comprehensive tests performed by a qualified testing agency.

- I. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- J. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements".
- K. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- L. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- M. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- N. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data".
- O. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

1.10 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractors Approval: Provide Contractor's approval signature and date on the Submittal Cover sheet certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1.11 ARCHITECT'S ACTION

- A. Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will respond to each submittal indicating one of the following actions required:
 - 1. NO EXCEPTIONS TAKEN (NET): Architect takes no exception to the submittal. This part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

2. FURNISH AS CORRECTED (FAC): No exceptions taken except what is identified by the Architect. The part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance. Furnish any additional related information as requested.
 3. REVISE AND RESUBMIT (RAR): Revise the submittal based on the Architects comments and resubmit the submittal. Do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Revise and Resubmit" to be used at the Project Site, or elsewhere where Work is in progress.
 4. REJECTED (REJ): The submittal is rejected. See Architects comments on why submittal was rejected.
 - a. Submittal has not been reviewed by the Contractor and so noted.
 - b. Submittal has been prepared without due regard for information called for or logically implied by the Contract Documents.
 - c. Information is not sufficiently complete or accurate to verify that work represented is in accordance with the Contract Documents.
 - d. Do not permit submittals marked "Rejected" to be used at the Project Site, or elsewhere where Work is in progress.
 5. NO ACTION TAKEN (NAT): The submittal is not required and will not be reviewed.
- B. Submittals by Newforma Info Exchange: Architect will indicate, on Newforma Info Exchange, the appropriate action.
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. The Architect's action will be noted in the Newforma Info Exchange.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect. The Architect's action will be noted in the Newforma Info Exchange and noted as a partial review until a full submittal can be received.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for re-submittal without review.
- F. Submittals not required by the Contract Documents will not be reviewed and will receive no action.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

**SECTION 014000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
 - 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of (5) five Projects similar in nature, size, and extent of this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
 - 1. The design professional shall be licensed to perform professional design services In the jurisdiction of the project location.

1.4 CONFLICTING REQUIREMENTS

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

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems.
 - 1. Seismic-force resisting system, designated seismic system, or component listed in the designated seismic system quality assurance plan prepared by the Architect.
 - 2. Main wind-force resisting system or a wind-resisting component listed in the wind-force-resisting system quality assurance plan prepared by the Architect.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include

the following:

1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm with (5) five years' experience in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm with (5) five years' experience in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual with (5) five years' experience in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to

ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Room Mockups: Construct room mockups as indicated on Drawings, incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Comply with requirements in "Mockups" Paragraph.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 6. Notify testing agencies at least (24) twenty four hours in advance of time when Work that requires testing or inspecting will be performed.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures".
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspecting equipment at Project site.

- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 QUALITY-CONTROL PLAN

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

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of the Owner and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, with a copy to Contractor, and to Authorities having Jurisdiction.

4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and re-inspecting corrected work.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

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

END OF SECTION 014000

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS - SINGLE PRIME CONTRACT**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Temporary heat.
 - 4. Ventilation and Humidity Control
 - 5. Sanitary facilities, including drinking water.
 - 6. Storm and sanitary sewer.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage containers.
 - 2. Dewatering facilities and drains.
 - 3. Temporary partitions and enclosures.
 - 4. Waste disposal services and dumpsters.
 - 5. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, and lights.
 - 3. Tree and plant protection.
 - 4. Security enclosure and lockup.
 - 5. Temporary enclosures.
 - 6. Temporary partitions.
 - 7. Enclosure fence for the work site.
- E. Related Sections:
 - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

1.2 INFORMATIONAL SUBMITTALS

- A. Temporary Utilities: The contractor shall submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within (15) fifteen days of the date established for submittal of the Contractor's Construction Schedule, the contractor shall submit a schedule indicating implementation and termination of each temporary utility for which the Contractor is responsible.
- C. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- D. Erosion and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent
- E. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

- F. **Moisture-Protection Plan:** Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- G. **Dust-Control and HVAC-Control Plan:** Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of the work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air filtration system discharge.
 - 4. Other dust-control measures.
 - 5. Waste management plan.

1.3 DEFINITIONS

- A. **Temporary Enclosure:** As determined by Architect, temporary roofing is complete, insulated, all exterior wall openings are closed with temporary closures.
- B. **Permanent Enclosure:** As determined by Architect, permanent roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.
- C. **Temporary Facilities:** Construction, fixtures, fittings, and other built items required to accomplish the work but which are not incorporated into the finished work.
- D. **Temporary Utilities:** A type of temporary facility, primary sources of electric power, water, natural gas supply, etc., obtained from public utilities, other main distribution systems, or temporary sources constructed for the project, but not including the fixtures and equipment served.
- E. **Temporary Services:** Activities required during construction, which do not directly accomplish the work.

1.4 QUALITY ASSURANCE

- A. **Regulations:** The contractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department and rescue squad rules.
 - 5. Environmental protection regulations.

16128.00

TEMPORARY FACILITIES AND
CONTROLS - SINGLE PRIME
CONTRACT

015000 - 3

- B. Standards: The Contractor shall comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
- C. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions.
- D. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- E. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1-2009.

1.5 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
 - 1. 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.
 - 2. 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.
 - 3. Gas Service from Existing System: Gas Service 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.
- B. Cost or use charges for temporary facilities are not chargeable to the Owner or the Architect. The Architect will not accept a prime contractor's cost or use charges for temporary services or facilities as a basis of claim for an adjustment in the Contract Sum or the Contract Time.
- C. Other entities using temporary services and facilities include, but are not limited to, the following:
 - 1. Other nonprime contractors.
 - 2. The Owner's work forces.
 - 3. The Architect.
 - 4. Testing agencies.
 - 5. Personnel of government agencies.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: If the Owner permits temporary use of the permanent facilities the Installer of each permanent service shall assume responsibility for its operation, maintenance, and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 PRODUCTS

2.1 MATERIALS

16128.00

TEMPORARY FACILITIES AND
CONTROLS - SINGLE PRIME
CONTRACT

015000 - 4

- A. Chain-Link Fencing: Minimum 2-inch OD, 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.
- B. 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.
- C. General: The contractor shall provide new materials. If acceptable to the Architect, undamaged, previously used materials in serviceable condition may be used. Provide materials suitable for use intended.
- D. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
 - 1. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
 - 2. For fences and vision barriers, provide minimum 3/8-inch thick exterior plywood.
 - 3. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.
- E. Gypsum Wallboard: Provide 5/8 type x gypsum wallboard on interior walls of temporary offices or temporary partitions.
- F. Roofing Materials: Provide UL Class A roofing materials on roofs of job-built temporary offices, shops, and sheds.
- G. Paint: Comply with requirements of Division 9 Section "Painting".
- H. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- I. Water: Provide potable water approved by local health authorities.
- J. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E84 and passing NFPA 701, Test Method 2.
- K. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- L. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Field Offices, General: Coordinate use of existing space within building for field office, with Owner.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations. Coordinate with Owner if use of existing building for storage and protection of materials is to be incorporated into Project.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

16128.00

TEMPORARY FACILITIES AND
CONTROLS - SINGLE PRIME
CONTRACT

015000 - 5

- A. General: The contractor shall provide new equipment. If acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4-inch heavy-duty, abrasion-resistant, flexible rubber hoses, 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- H. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- I. HVAC Equipment: Upon Building enclosure or unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures".

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

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

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged.
1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Connect temporary sewers to the municipal system as directed by sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- C. Sanitary Facilities: The General Contractor will provide temporary toilets for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
 2. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
- D. Water Service: 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.
- E. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
1. Connect temporary service to Owner's existing power source, as directed by Owner.
- F. Temporary Heating: Provide temporary heating 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. Coordinate ventilation requirements to produce the ambient condition required and minimize energy consumption. Direct fired propane or Kerosene salamanders will not be permitted.
1. Temporary Heat: Provide temporary heat in all existing areas that are under construction and/or have their permanent heat temporarily or permanently shut off for construction reasons.
 2. Temporary heat must be installed, operated, maintained, and dismantled in a safe, legal manner.
 3. Provide adequate ventilation as required by Codes and labor laws in all areas of Project limits as part of the work of this Section.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

16128.00

TEMPORARY FACILITIES AND
CONTROLS - SINGLE PRIME
CONTRACT

015000 - 7

- H. Drinking-Water Facilities: The Contractor shall provide containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- I. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering areas of completed work.
 - 1. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: 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.
 - 2. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. 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.
- C. Temporary Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION OF FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Temporary Site Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

- F. Enclosure Fence: When excavation begins the contractor will install an enclosure fence with lockable entrance gates. Install in a manner that will prevent the public and animals from easily entering the site, except by the entrance gates.
1. Provide open-mesh, 6-foot high chain link fence with posts.
 2. Extent of Fence: As indicated on drawings.
 3. Provide min. 2 double swing access gates and man gates. Each gate is to have a chain and padlock.
 4. Provide (2) two keys for each lock to the Owner's Representative.
 5. Remove fence upon completion of all exterior activities or sooner if directed by Architect.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. 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.
 2. Prohibit smoking in construction areas.
 3. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
 5. Store combustible materials in containers in fire-safe locations
 6. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

3.5 MOISTURE AND MOLD CONTROL

- A. Controlled Construction Phase of Construction: After completing and sealing of the permanent 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. The Contractor is to provide temporary dehumidification and ventilation until the building systems are operational and the spaces are substantially completed.
 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) forty-eight hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level in (48) forty-eight hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

16128.00

TEMPORARY FACILITIES AND
CONTROLS - SINGLE PRIME
CONTRACT

015000 - 9

- A. Supervision: Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. 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.
- D. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

**SECTION 016000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

- A. Comparable Product Requests (if allowed): After award of contract submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within (10) ten days of receipt of request, or (7) seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures". Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously

selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 6. Protect stored products from damage and liquids from freezing.
 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

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

3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures".

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected", Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.
 - b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 4. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 EQUIVALENT PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for equivalent product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B. Refer to specification section 012519 "Equivalents" for additional equivalent product requirements required to be furnished by the contractor prior to execution of the contract.

PART 3 EXECUTION (NOT USED)

END OF SECTION 016000

**SECTION 017300
EXECUTION**

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
- B. Related Requirements:
 - 1. Division 01 "Summary" for limits on use of Project site.
 - 2. Division 02 "Demolition" for demolition and removal of selected portions of the building.
 - 3. Division 07 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in

Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.
- C. 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 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.
- D. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- E. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary".
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to

minimize interruption to occupied areas.

- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch extending to an inside or outside corner of a wall. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable

- timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls".
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements".

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 3. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 ACTION SUBMITTALS

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

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

1.5 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. **The Architect will not perform a punch list inspection until the contractor's punch list is received and reviewed.**
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of (30) thirty 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, final completion construction photographic documentation, 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 where applicable.
 - 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 Architect's signature for receipt of submittals.
 5. Submit test/adjust/balance 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 (30) thirty days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Complete startup and testing of systems and equipment
 3. Submit test/adjust/balance records.
 4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 5. Perform preventive maintenance on equipment used prior to Substantial Completion. Complete startup testing of systems.
 6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training".
 7. Touch up paint and otherwise repair and restore damaged finishes.
 8. Complete final cleaning requirements, including touchup painting
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of (30) thirty 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. The Architects basic services include (1) one initial punch list and (1) one follow-up punch list inspection to ensure all corrective action and or incomplete work has been finished. The Contractor is responsible to the Owner for all costs incurred by the Architect for additional services to provide multiple punch lists for the same work area. The cost for these additional services, may be deducted from the Contractors Contract by deduct Change Order.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.6 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 according to Section 012900 "Payment Procedures".
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit pest-control final inspection report.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Advise Owner of pending insurance changeover requirements.
 6. Advise Owner of changeover in heat and other utilities.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 10. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 11. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 12. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
- B. Inspection: Submit a written request for final inspection to determine acceptance, a minimum of (10) ten 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Architect will return annotated file.
 - b. PDF electronic file. Architect will return annotated file.

- c. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).
- d. Submit (3) three paper copies. Architect will return (2) two copies.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within (15) fifteen days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.1 MATERIALS

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

PART 3 EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.

- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical, electrical, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
 - p. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities Controls".

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 017700

**SECTION 017823
OPERATION AND MAINTENANCE DATA****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Divisions 02 through 49 Sections for any specific closeout requirements for the Work in those Sections.

1.2 DEFINITIONS

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

1.3 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least (30) thirty days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least (15) fifteen days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within (15) fifteen days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 PRODUCTS**2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 - 1. List of systems.
 - 2. List of equipment.
- B. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:

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

2.4 OPERATION MANUALS

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

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

2.5 PRODUCT MAINTENANCE MANUALS

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

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and

service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents".
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

**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.

1.2 CLOSEOUT SUBMITTAL

- 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 (1) one of file prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - 3) Submit Record Digital Data Files and (1) one set(s) of plots.
 - b. Final Submittal:
 - 1) Submit PDF electronic files of scanned record prints and One set(s) of prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit (1) one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit (1) one paper copy of each submittal.
1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit (1) one paper copy of each submittal.

1.3 RECORD DRAWINGS

- A. Record Drawings: 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 drawings 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 archive 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 below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
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 sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 7. Submit as indicated in the Article 1.2 final submittal.

1.4 RECORD PRODUCT DATA

- A. 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 and record Drawings where applicable.
 4. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.
 5. Submit as indicated in the Article 1.2 final submittal.

1.5 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.
 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.
 2. Submit as indicated in the Article 1.2 final submittal.

PART 2 PRODUCT (NOT USED)

PART 3 EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

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

END OF SECTION 017839

**SECTION 017900
DEMONSTRATION AND TRAINING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
1. Demonstration of operation of systems, subsystems, and equipment.
 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.2 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit one copies within seven days of end of each training module.
- B. At completion of training, submit complete training manual(s) for Owner's use, prepared and bound in format matching operation and maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.4 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

PART 2 PRODUCTS**2.1 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

PART 3 EXECUTION**3.1 INSTRUCTION**

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

END OF SECTION 017900

**SECTION 024100
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 011000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- C. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- E. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2022.

1.04 SUBMITTALS

- A. See Section 013300-Submittal Procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Polyethylene Sheet: 6 mm.

PART 3 EXECUTION

3.01 SCOPE

- A. Remove paving and curbs as required to accomplish new work.
- B. Remove other items indicated, for salvage, relocation, and disposal.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with other requirements specified in Section 017000.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Do not close or obstruct roadways or sidewalks without permit.

6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
- C. Do not begin removal until receipt of notification to proceed from Owner.
- D. Protect existing structures and other elements that are not to be removed.
 1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
- E. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- F. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.
- G. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- E. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 1. Verify that construction and utility arrangements are as indicated.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 2. Remove items indicated on drawings.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. Verify that abandoned services serve only abandoned facilities before removal.

4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
 1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

**SECTION 028213
ASBESTOS ABATEMENT**

SUMMARY

- 1.1 THIS ASBESTOS ABATEMENT PROJECT WILL CONSIST OF THE REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS AT THE , IN LACKAWANNA, [NEW YORK] . THE SCOPE OF WORK IS INDICATED ON THE DRAWINGS.**
- 1.2 PROVIDE ABATEMENT OF LARGE, SMALL AND MINOR AMOUNTS OF ASBESTOS IN ACCORDANCE WITH DEFINITION AND DESCRIPTIONS OF CODE 56 AND AS FOLLOWS.**
- 1.3 THIS SECTION INCLUDES THE FOLLOWING:**
 - A. Demolition and removal of ACM including the following:
 1. [Pipe insulation.]
 2. [Vinyl asbestos tile floors.]
 - a. See specific removal requirements for cut back mastic in Part 3]
 3. [Caulking]
 4. [Other ACM as indicated.]
 - 5.
 - B. [Installation of isolation barriers to contain areas with asbestos scheduled to remain from areas that will be abated under the scope of this project]

- 1.4 THE CONTRACTOR SHALL BE AWARE OF ALL CONDITIONS OF THE PROJECT AND IS RESPONSIBLE FOR VERIFYING QUANTITIES AND LOCATIONS OF ALL WORK TO BE PERFORMED. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF ITS OBLIGATION TO FURNISH ALL LABOR AND MATERIALS NECESSARY TO PERFORM THE WORK.**
- 1.5 ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE PROJECT DOCUMENTS AND ALL GOVERNING CODES, RULES, AND REGULATIONS. WHERE CONFLICTS OCCUR BETWEEN THE PROJECT DOCUMENTS AND APPLICABLE CODES, RULES, AND REGULATIONS, THE MORE STRINGENT SHALL APPLY.**
- 1.6 WORKING HOURS SHALL BE AS REQUIRED AND APPROVED BY THE OWNER. ASBESTOS ABATEMENT ACTIVITIES INCLUDING, BUT NOT LIMITED TO, WORK AREA PREPARATION, GROSS REMOVAL ACTIVITIES, CLEANING ACTIVITIES, WASTE REMOVAL, ETC. MAY NEED TO BE PERFORMED DURING ‘OFF-HOURS’ (INCLUDING NIGHTS AND WEEKENDS). IN ADDITION, MULTIPLE MOBILIZATIONS MAY BE REQUIRED TO PERFORM THE WORK IDENTIFIED IN THIS PROJECT. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE FACILITY AND OWNER’S REPRESENTATIVE REGARDING SCHEDULING.**
- 1.7 [NO SITE-SPECIFIC VARIANCES HAVE BEEN OBTAINED FOR THIS PROJECT. THE CONTRACTOR MAY APPLY FOR SUCH SITE-SPECIFIC VARIANCES AT THEIR OPTION. PAYMENT FOR SUCH VARIANCES SHALL BE PAID FOR BY THE CONTRACTOR. USE OF SUCH VARIANCES SHALL BE SUBJECT TO APPROVAL BY THE ARCHITECT]**
- 1.8 CHANGE ORDERS DUE TO VARIANCES: ANY VARIANCE TO REGULATORY REQUIREMENTS SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE REGULATORY AGENCY SHALL BE EXECUTED UPON APPROVAL BY THE OWNER PURSUANT TO REVIEW OF CHANGE IN SCOPE OF WORK AND CHANGE IN CONTRACT COST RESULTING IN COST.**
 - A. Change Orders shall be prepared and issued in accordance with Division 01 Section “Contract Modification Procedures.”
 - B. Variances which include the use of a remote personal decontamination enclosure system for interior abatement will not be permitted when asbestos removal includes friable material other than vinyl asbestos tile or approved glove bag operations.

RELATED SECTIONS

- 2.1 DIVISION 01 SECTION "SUMMARY" FOR USE OF PREMISES AND OWNER-OCCUPANCY REQUIREMENTS.**
- 2.2 DIVISION 01 SECTION "ASBESTOS TESTING LABORATORY SERVICES" FOR OWNER-PROVIDED AIR-MONITORING SERVICES.**
- 2.3 DIVISION 01 SECTION "TEMPORARY FACILITIES AND CONTROLS" FOR GENERAL TEMPORARY CONSTRUCTION AND ENVIRONMENTAL-PROTECTION MEASURES FOR DEMOLITION OPERATIONS.**
- 2.4 DIVISION 01 SECTION "CUTTING AND PATCHING" FOR CUTTING AND PATCHING PROCEDURES.**
- 2.5 DIVISION 02 SECTION "SELECTIVE DEMOLITION" FOR DEMOLITION OF SELECTED PORTIONS OF BUILDINGS AND STRUCTURES THAT ARE NOT ACM.**
- 2.6 DIVISION 07 SECTION "PREPARATION FOR RE-ROOFING" FOR ROOFING REMOVAL WORK THAT PRECEDES OR IS COINCIDENT WITH ACM REMOVAL AT ROOF AREAS.**
- 2.7 DIVISION 09 FOR ALL RESILIENT FLOORING FINISHES AND THE ABATEMENT WORK THAT MAY AFFECT THE INSTALLATION OF NEW MATERIALS**

DEFINITIONS

- 3.1 ABATEMENT: ANY PORTION OF A PROJECT THAT INCLUDED PROCEDURES TO CONTROL RELEASE FROM ANY ASBESTOS CONTAINING MATERIAL. THIS INCLUDES REMOVAL, ENCAPSULATION, REPAIR OR HANDLING OR POSSIBLE EXPOSURE FROM CONSTRUCTION RELATED WORK THAT MAY RESULT IN THE RELEASE OF ASBESTOS FIBERS.**
- 3.2 ACM: ASBESTOS-CONTAINING MATERIALS OR ASBESTOS-CONTAMINATED MATERIALS. REFER TO DIVISION 00 SECTION "EXISTING HAZARDOUS MATERIALS INFORMATION" FOR REPORTS PROVIDING INFORMATION ON EXISTING ACM.**
- 3.3 REGULATORY REQUIREMENTS: LAWS, RULES AND REGULATIONS OF AUTHORITIES HAVING JURISDICTION OVER THE HANDLING, REMOVAL, TRANSPORTATION AND DISPOSAL OF ACM, INCLUDING LOCAL, STATE AND FEDERAL REGULATIONS LISTED UNDER "QUALITY ASSURANCE" ARTICLE.**
- 3.4 REMOVE: DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF-SITE.**
- 3.5 EXISTING TO REMAIN: EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, REMOVED AND SALVAGED, OR REMOVED AND REINSTALLED.**
- 3.6 TSI: THERMAL SYSTEMS INSULATION**
- 3.7 VAT: VINYL ASBESTOS TILE**

PERMITS AND COMPLIANCE

- 4.1 THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND LIABILITY FOR COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, AND REGULATIONS PERTAINING TO WORK PRACTICES, PROTECTION OF WORKERS, AUTHORIZED VISITORS TO THE SITE, PERSONS, AND PROPERTY ADJACENT TO THE WORK.**

- 4.2 PERFORM ASBESTOS RELATED WORK IN ACCORDANCE WITH NEW YORK STATE INDUSTRIAL CODE RULE 56, 40 CFR 61, AND 29 CFR 1926, AS SPECIFIED HEREIN. WHERE MORE STRINGENT REQUIREMENTS ARE SPECIFIED, ADHERE TO THE MORE STRINGENT REQUIREMENTS. EFFECTIVE SEPTEMBER 5, 2006 ALL WORK CONDUCTED MUST BE IN ACCORD WITH AMENDED ICR-56 THAT WAS ADOPTED ON JANUARY 11, 2006.**
- 4.3 THE CONTRACTOR AND ITS SUBCONTRACTORS PERFORMING ASBESTOS ABATEMENT WORK MUST MAINTAIN CURRENT LICENSES PURSUANT TO NEW YORK STATE DEPARTMENT OF LABOR AND DEPARTMENT OF ENVIRONMENTAL CONSERVATION FOR ALL WORK RELATED TO THIS PROJECT, INCLUDING THE REMOVAL, HANDLING, TRANSPORT, AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS. THE CONTRACTOR IS RESPONSIBLE FOR MAKING SURE THAT ITS SUBCONTRACTORS PERFORMING THIS WORK ARE COMPLIANT WITH THE AMENDED ICR 56.**
- 4.4 THE CONTRACTOR MUST HAVE AND SUBMIT PROOF UPON REQUEST THAT ANY PERSONS EMPLOYED BY THE CONTRACTOR TO ENGAGE IN OR SUPERVISE WORK ON ANY ASBESTOS PROJECT HAVE A VALID NYS ASBESTOS HANDLING CERTIFICATE PURSUANT TO INDUSTRIAL CODE RULE 56.**
- 4.5 THE CONTRACTOR SHALL COMPLY FULLY WITH ANY VARIANCES SECURED FROM REGULATORY AGENCIES FOLLOWING OWNER APPROVAL IN THE PERFORMANCE OF THE WORK. SHOULD THE CONTRACTOR CHOOSE TO APPLY FOR A SITE SPECIFIC VARIANCE, APPROVAL OF THE OWNER IS FIRST REQUIRED. ANY CONTRACTOR SUBMITTED PETITION FOR A SITE SPECIFIC VARIANCE MUST BE SUBMITTED BY THE CONTRACTOR (AT HIS/HER OWN COST) A MINIMUM OF TWO WEEKS PRIOR TO COMMENCEMENT OF THE PROJECT. ANY PETITION FOR VARIANCE MUST BE COMPLETED AND SUBMITTED BY A PERSON POSSESSING A VALID NYSDOL PROJECT DESIGNER CERTIFICATION.**
- 4.6 IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE WHAT, IF ANY, PATENTS ARE APPLICABLE TO THE PROJECT. THE CONTRACTOR SHALL PAY ALL ROYALTIES AND/OR LICENSE FEES. HE SHALL DEFEND ALL SUITS OR CLAIMS FOR INFRINGEMENT OF ANY PATENT RIGHTS AND SAVE THE OWNER, ARCHITECT, ENGINEER, ENVIRONMENTAL CONSULTANT, AND CONSTRUCTION MANAGER HARMLESS FROM LOSS, INCLUDING ATTORNEY'S FEES, ON ACCOUNT THEREOF.**
- 4.7 FAILURE TO ADHERE TO THE PROJECT DOCUMENTS SHALL CONSTITUTE A BREACH OF THE CONTRACT AND THE OWNER SHALL HAVE THE RIGHT TO AND MAY TERMINATE THE CONTRACT PROVIDED, HOWEVER, THE FAILURE OF THE OWNER TO SO TERMINATE SHALL NOT RELIEVE THE CONTRACTOR FROM FUTURE COMPLIANCE.**

APPLICABLE STANDARDS AND REGULATIONS

- 5.1 REGULATORY REQUIREMENTS: COMPLY WITH GOVERNING EPA NOTIFICATION REGULATIONS BEFORE BEGINNING ACM DEMOLITION. COMPLY WITH HAULING AND DISPOSAL REGULATIONS OF AUTHORITIES HAVING JURISDICTION. COMPLY WITH THE CURRENT AND APPLICABLE PORTIONS OF THE FOLLOWING:**
- A. New York State Regulations:
1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 adopted March 7, 2007 (DOL) referred to as "Code Rule 56" of the NYS Codes, Rules and Regulations (Statutory Authority:

New York State Labor Law Section 906).

- a. Exception: Variances obtained in accordance with Article 30 of the Labor Law.
 2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
 3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)
 4. 12NYCRR56, New York State School Asbestos Safety Act (SASA).
- B. Federal Regulations:
1. Asbestos Hazard Emergency Response Act (AHERA) regulations, EPA Final Rule and Notice for Asbestos-Containing Material in Schools, 40 CFR Part 763.
 2. 29 CFR 1910.1001, "Asbestos" (OSHA)
 3. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
 4. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
 5. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
 6. 29 CFR 1926, "Construction Industry" (OSHA)
 7. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)
 8. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
 9. 40 CFR 61, Subpart A, "General Provisions" (EPA)
 10. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
 11. 49 CFR 171-172, Transportation Standards (DOT)
- C. Regulations and Requirements of NYS Agencies :
1. Building Code of New York State (BCNYS).
 2. New York State Education Department (SED).
 3. New York State Department of Labor (DOL).
 4. New York State Department of Health (DOH).
 5. New York State Department of Environmental Conservation (DEC).
- D. Regulations and Requirements of Federal Agencies:
1. Occupational Safety and Health Administration (OSHA).
 2. United States Environmental Protection Agency (EPA).
- E. National Standards:
1. National Electrical Code (NEC).

5.2 STANDARDS AND GUIDANCE DOCUMENTS:

- A. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
- B. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
- C. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
- D. EPA 530-SW-85-007, Asbestos Waste Management Guidance

QUALITY ASSURANCE

6.1 ACM DEMOLITION FIRM QUALIFICATIONS: A FULLY-LICENSED, CERTIFIED AND EXPERIENCED FIRM THAT HAS QUALIFIED WORKERS SPECIALIZED IN ACM DEMOLITION WORK SIMILAR IN MATERIAL AND EXTENT TO THAT INDICATED FOR THIS PROJECT.

- A. Firms shall be EPA-certified, and as follows:
 1. Firms shall be certified by the NYS Commissioner of Labor.
- B. Workers shall have successfully completed an EPA-certified safety training program, and as follows:
 1. All workers shall be certified by the NYS Department of Health.

- C. Firms that employ workers who are fully licensed and certified in accordance with Regulatory Requirements to perform the Work indicated may be qualified as determined by the Architect.

SUBMITTALS

7.1 QUALIFICATION DATA: FOR FIRM AND WORKERS PERFORMING ACM DEMOLITION.

- A. Licenses and certifications.
1. EPA Certifications.
2. NYS Asbestos Handling Licenses.
B. Notice of Project Commencement: Per EPA requirements.

7.2 SCHEDULE OF ACM DEMOLITION ACTIVITIES: INDICATE THE FOLLOWING:

- A. Detailed sequence of ACM demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
B. Interruption of utility services. Indicate how long utility services will be interrupted.
C. Coordination for shutoff, capping, and continuation of utility services.
D. Use of elevator and stairs.
E. Locations and construction of proposed containment partitions and means of egress.
F. Work area entry and exit procedures.
G. Equipment and waste container decontamination and removal procedures, including waste decontamination enclosure systems.
H. Engineering controls for ventilation and negative pressure.
I. Signage as required.
J. Locations and construction of proposed personal decontamination enclosure systems.
K. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
L. Means of protection for items to remain and items in path of ACM waste removal from building.
M. Coordination with Owner's air sampling in areas where ACM removal is proceeding or completed.

7.3 PRE-WORK SUBMITTALS: WITHIN 7 DAYS PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, THE CONTRACTOR SHALL SUBMIT 3 COPIES OF THE DOCUMENTS LISTED BELOW:

- A. Contractor and Subcontractor licenses issued by New York State Department of Labor.
B. A list of all Workers used in the performance of the Project, including name and a copy of their current NYSDOL Asbestos certification.
C. For each Worker used in the performance of the Project, submit required employee statements including current Medical Examination Statement, current asbestos training certification, Worker's Acknowledgment Statement, Respirator Fit Test, and Employee Training Statement.
D. A list of Projects performed within the past two (2) years including the dollar value of all Projects. Provide Project references to include Owner, consultant, and air monitoring firm's name, contact persons, address, and phone number.
E. Progress Schedule:
F. Show the complete sequence of abatement activities and the sequencing of Work within each building or building section.
G. Show the dates for the beginning and completion of each major element of Work including substantial completion dates for each Work Area, building, or phase.

- H. Project Notifications: As required by Federal and State regulatory agencies together with proof of transmittal (i.e. certified mail return receipt).
- I. Building Occupant Notification: As required by regulatory agencies.
- J. Abatement Work Plan: Provide plans that clearly indicate the following:
 - 1. All Work Areas/containments numbered sequentially.
 - 2. Locations and types of all decontamination enclosures.
 - 3. Entrances and exits to the Work Areas/containments.
 - 4. Type of abatement activity/technique for each Work Area/containment.
 - 5. Number and location of negative air units and exhaust. Also provide calculations for determining number of negative air pressure units.
 - 6. Proposed location and construction of storage facilities and field office.
 - 7. Location of water and electrical connections to building services.
 - 8. Waste transport routes through the building to the waste storage container.
- K. Disposal Site/Landfill Permit from applicable regulatory agency.
- L. NYS Department of Environmental Conservation Waste Transporter Permit.
- M. Material Safety Data Sheets of supplies/chemicals to be used on the Project.

7.4 ON-SITE SUBMITTALS: REFER TO PART 3.01.D FOR ALL SUBMITTALS, DOCUMENTATION, AND POSTINGS REQUIRED TO BE MAINTAINED ON-SITE DURING ABATEMENT ACTIVITIES.

7.5 PROJECT CLOSE-OUT SUBMITTALS: WITHIN 30 DAYS OF PROJECT COMPLETION, THE CONTRACTOR SHALL SUBMIT (3) BOUND COPIES OF PROJECT RECORDS, LOGS, INSPECTIONS AND CHAIN-OF-CUSTODY PER REGULATORY REQUIREMENTS.

- A. Originals of all waste disposal manifests, seals, and disposal logs.
- B. Daily progress log, including the entry/exit log.
- C. Final project notifications and variances.
- D. Submit all material, product and equipment data used by the Contractor during the asbestos abatement project, including manufacturer's name, specifications and application instructions for surfactants, encapsulants and removal equipment.
- E. Submit manufacturer's data regarding EPA- and OSHA-approved containment, storage products, and removal equipment.

7.6 LANDFILL RECORDS: INDICATE RECEIPT AND ACCEPTANCE OF HAZARDOUS WASTES BY A LANDFILL FACILITY LICENSED TO ACCEPT HAZARDOUS WASTES.

- A. Submit name and permit of the Industrial Waste Hauler in accordance with Title 6 NYCRR364 for transporting of waste asbestos-containing materials to a disposal site. Include authorization from the intended disposal site.
- B. Submit name and permit in accordance with Title 6 NYCRR360, issued by the NYS DEC for acceptable landfill sites.

NOTICES

8.1 THE CONTRACTOR SHALL PROVIDE NOTIFICATION OF INTENT TO COMMENCE ASBESTOS ABATEMENT ACTIVITIES AS INDICATED BELOW.

- A. At least ten (10) Working days prior to beginning abatement activities, send written notification to:
 - 1) S. Environmental Protection Agency
 - 2) National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator
 - 3) 26 Federal Plaza

- 4) New York, NY 10007.
- B. At least ten (10) days prior to beginning abatement activities send written notification to:
 - 1) New York State Department of Labor
 - 2) Division of Safety and Health, Asbestos Control Program.
 - 3) State Office Campus
 - 4) Building 12 - Room 454
 - 5) Albany, NY 12240
 - 6)

8.2 THE CONTRACTOR IS REQUIRED TO SEND NOTIFICATIONS TO REGULATORY AGENCIES VIA MAIL OR PACKAGE DELIVERY SERVICE THAT WILL PROVIDE PROOF OF DELIVERY AND RECEIPT.

8.3 THE CONTRACTOR SHALL POST AND/OR PROVIDE BUILDING OCCUPANT NOTIFICATION AT LEAST 10 DAYS PRIOR TO BEGINNING ABATEMENT ACTIVITIES AS REQUIRED BY NYS INDUSTRIAL CODE RULE 56. THE POSTING SHALL INCLUDE THE FOLLOWING INFORMATION:

- A. The locations of the abatement Project.
- B. The amounts and types of asbestos containing materials being abated.
- C. The commencement and completion dates of the Project.
- D. The name, address, and asbestos license number of the Abatement Contractor.
- E. The name, address, and asbestos license number of the Environmental Consultant and laboratory.

PROJECT MONITORING AND AIR SAMPLING

9.1 THE OWNER HAS ENGAGED THE SERVICES OF A NYSDOL CERTIFIED PROJECT MONITOR AND AIR TECHNICIAN (ENVIRONMENTAL CONSULTANT) WHO SHALL SERVE AS THE OWNER'S REPRESENTATIVE IN REGARD TO THE PERFORMANCE OF THE ASBESTOS ABATEMENT PROJECT AND PROVIDE DIRECTION AS REQUIRED THROUGHOUT THE ENTIRE ABATEMENT PERIOD.

9.2 THE CONTRACTOR IS REQUIRED TO ENSURE COOPERATION OF ITS PERSONNEL WITH THE CONSULTANT FOR THE AIR SAMPLING AND PROJECT MONITORING FUNCTIONS DESCRIBED BELOW. THE CONTRACTOR SHALL COMPLY WITH ALL DIRECTION GIVEN BY THE CONSULTANT DURING THE COURSE OF THE PROJECT.

9.3 THE CONSULTANT SHALL PROVIDE THE FOLLOWING ADMINISTRATIVE SERVICES:

- A. Review and approve or disapprove all submittals, shop drawings, schedules, and samples.
- B. Assure that all notifications to governmental agencies by the Contractor are submitted in a timely manner and are correct in content.
- C. Review and approve the Contractor's OSHA compliance testing laboratory.

- 9.4 THE CONSULTANT SHALL STAFF THE PROJECT WITH A TRAINED AND CERTIFIED PERSON(S) TO ACT ON THE OWNER'S BEHALF AT THE JOB SITE. THE CONSULTANT SHALL PROVIDE THE NECESSARY AIR SAMPLING AS REQUIRED BY NYSDOL CODE RULE 56 AND THE SITE SPECIFIC VARIANCE OBTAINED FOR THIS PROJECT. IN ADDITION, THEY SHALL PROVIDE THE FINAL VISUAL INSPECTION AS REQUIRED BY NYSDOL CODE RULE 56-9.1(D) (1) AND THE SITE SPECIFIC VARIANCE.**

CONTRACTOR AIR SAMPLING

- 10.1 IN ADDITION TO THE REQUIREMENTS OF OSHA 1926.1101, THE CONTRACTOR SHALL BE REQUIRED TO PERFORM PERSONAL AIR MONITORING EVERY WORK SHIFT IN EACH WORK AREA DURING WHICH ABATEMENT ACTIVITIES OCCUR IN ORDER TO DETERMINE THAT APPROPRIATE RESPIRATORY PROTECTION IS BEING WORN AND UTILIZED.**
- 10.2 THE CONTRACTOR SHALL CONDUCT AIR SAMPLING THAT IS REPRESENTATIVE OF BOTH THE 8-HOUR TIME WEIGHTED AVERAGE AND 30-MINUTE SHORT-TERM EXPOSURES TO INDICATE COMPLIANCE WITH THE PERMISSIBLE EXPOSURE AND EXCURSION LIMITS.**
- 10.3 THE CONTRACTOR'S LABORATORY ANALYSIS OF AIR SAMPLES SHALL BE CONDUCTED BY AN NYS DOH ELAP APPROVED LABORATORY, SUBJECT TO APPROVAL OF THE ENVIRONMENTAL CONSULTANT.**
- 10.4 RESULTS OF PERSONNEL AIR SAMPLE ANALYSES SHALL BE AVAILABLE, VERBALLY, WITHIN TWENTY-FOUR (24) HOURS OF SAMPLING AND SHALL BE POSTED UPON RECEIPT. WRITTEN LABORATORY REPORTS SHALL BE DELIVERED AND POSTED AT THE WORK SITE WITHIN FIVE (5) DAYS. FAILURE TO COMPLY WITH THESE REQUIREMENTS MAY RESULT IN ALL WORK BEING STOPPED UNTIL COMPLIANCE IS ACHIEVED.**

PROJECT SUPERVISOR

- 11.1 THE CONTRACTOR SHALL DESIGNATE A FULL-TIME PROJECT SUPERVISOR WHO SHALL MEET THE FOLLOWING QUALIFICATIONS:**
- A. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
 - B. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
 - C. The Project Supervisor must be able to read and write English fluently, as well as communicate in the primary language of the Workers.

- 11.2 IF THE PROJECT SUPERVISOR IS NOT ON-SITE AT ANY TIME WHATSOEVER, ALL WORK SHALL BE STOPPED. THE PROJECT SUPERVISOR SHALL REMAIN ON-SITE UNTIL THE PROJECT IS COMPLETE. THE PROJECT SUPERVISOR CANNOT BE REMOVED FROM THE PROJECT WITHOUT THE WRITTEN CONSENT OF THE OWNER AND THE ENVIRONMENTAL CONSULTANT. THE PROJECT SUPERVISOR SHALL BE REMOVED FROM THE PROJECT IF SO REQUESTED BY THE OWNER.**
- 11.3 THE PROJECT SUPERVISOR SHALL MAINTAIN THE PROJECT LOG BOOK REQUIRED BY NEW YORK STATE DEPARTMENT OF LABOR AND SECTION 2.03 OF THE SPECIFICATIONS AND THE WASTE DISPOSAL LOG REQUIRED BY SECTION 4.04 OF THE SPECIFICATIONS.**
- 11.4 THE PROJECT SUPERVISOR SHALL BE RESPONSIBLE FOR THE PERFORMANCE OF THE WORK AND SHALL REPRESENT THE CONTRACTOR IN ALL RESPECTS AT THE PROJECT SITE. THE SUPERVISOR SHALL BE THE PRIMARY POINT OF CONTACT FOR THE ASBESTOS PROJECT MONITOR.**

MEDICAL REQUIREMENTS

- 12.1 BEFORE EXPOSURE TO AIRBORNE ASBESTOS FIBERS, PROVIDE WORKERS WITH A COMPREHENSIVE MEDICAL EXAMINATION AS REQUIRED BY 29 CFR 1910.1001, AND 29 CFR 1926.1101.**
- A. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1910.1001, and 29 CFR 1926.1101 within the past year.
 - B. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos fibers and within thirty (30) calendar days before or after the termination of employment in such occupations.

- 12.2 AS REQUIRED BY 29 CFR 1910.1001, AND 29 CFR 1926.1101 MAINTAIN COMPLETE AND ACCURATE RECORDS OF EMPLOYEES' MEDICAL EXAMINATIONS FOR A PERIOD OF THIRTY (30) YEARS AFTER TERMINATION OF EMPLOYMENT AND MAKE RECORDS OF THE REQUIRED MEDICAL EXAMINATIONS AVAILABLE FOR INSPECTION AND COPYING TO: THE ASSISTANT SECRETARY OF LABOR FOR OCCUPATIONAL SAFETY AND HEALTH, THE DIRECTOR OF THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH), AUTHORIZED REPRESENTATIVES OF EITHER OF THEM, AND AN EMPLOYEES PHYSICIAN UPON THE REQUEST OF THE EMPLOYEE OR FORMER EMPLOYEE.**
- 12.3 THE CONTRACTOR SHALL FURNISH THE OWNER EVIDENCE OF ITS FIRM'S MEDICAL SURVEILLANCE PROGRAM REQUIRED UNDER 29 CFR 1910.1001, AND 29 CFR 1926.1101.**

TRAINING

- 13.1 AS REQUIRED BY APPLICABLE REGULATIONS, PRIOR TO ASSIGNMENT TO ASBESTOS WORK INSTRUCT EACH EMPLOYEE WITH REGARD TO THE HAZARDS OF ASBESTOS, SAFETY AND HEALTH PRECAUTIONS, AND THE USE AND REQUIREMENTS OF PROTECTIVE CLOTHING AND EQUIPMENT.**
- 13.2 ESTABLISH A RESPIRATOR PROGRAM AS REQUIRED BY ANSI Z88.2 AND 29 CFR 1910.134, AND 29 CFR 1926.1101. PROVIDE RESPIRATOR TRAINING AND FIT TESTING.**

RESPIRATORY PROTECTION

- 14.1 SELECT RESPIRATORS FROM THOSE APPROVED BY THE MINE SAFETY AND HEALTH ADMINISTRATION (MSHA), AND THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH), DEPARTMENT OF HEALTH AND HUMAN SERVICES.**
- 14.2 RESPIRATORS SHALL BE INDIVIDUALLY FIT-TESTED TO PERSONNEL UNDER THE DIRECTION OF AN INDUSTRIAL HYGIENIST ON A YEARLY BASIS. FIT-TESTED RESPIRATORS SHALL BE PERMANENTLY MARKED TO IDENTIFY THE INDIVIDUAL FITTED, AND USE SHALL BE LIMITED TO THAT INDIVIDUAL. FIT-TEST RECORDS SHALL BE MAINTAINED ON SITE FOR EACH EMPLOYEE.**
- 14.3 WHERE FIBER LEVELS PERMIT, AND IN COMPLIANCE WITH REGULATORY REQUIREMENTS, POWERED AIR PURIFYING RESPIRATORS (PAPR) ARE THE MINIMUM ALLOWABLE RESPIRATORY PROTECTION PERMITTED TO BE UTILIZED DURING GROSS REMOVAL OPERATIONS.**
- 14.4 NO RESPIRATORS SHALL BE ISSUED TO PERSONNEL WITHOUT SUCH PERSONNEL PARTICIPATING IN A RESPIRATOR TRAINING PROGRAM.**
- 14.5 HIGH EFFICIENCY PARTICULATE AIR (HEPA) RESPIRATOR FILTERS SHALL BE APPROVED BY NIOSH AND SHALL CONFORM TO THE OSHA REQUIREMENTS IN 29 CFR 1910.134 AND 29 CFR 1926.1101.**
- 14.6 A STORAGE AREA FOR RESPIRATORS SHALL BE PROVIDED BY THE CONTRACTOR IN THE CLEAN ROOM SIDE OF THE PERSONNEL DECONTAMINATION ENCLOSURE WHERE THEY WILL BE KEPT IN A CLEAN ENVIRONMENT.**
- 14.7 THE CONTRACTOR SHALL PROVIDE AND MAKE AVAILABLE A SUFFICIENT QUANTITY OF RESPIRATOR FILTERS SO THAT FILTER CHANGES CAN BE MADE AS NECESSARY DURING THE WORK DAY. FILTERS WILL BE REMOVED AND DISCARDED DURING THE DECONTAMINATION PROCESS. FILTERS CANNOT BE REUSED. FILTERS MUST BE CHANGED IF BREATHING BECOMES DIFFICULT.**

- 14.8 FILTERS USED WITH NEGATIVE PRESSURE AIR PURIFYING RESPIRATORS SHALL NOT BE USED ANY LONGER THAN ONE EIGHT (8) HOUR WORK DAY.**
- 14.9 ANY AUTHORIZED VISITOR, WORKER, OR SUPERVISOR FOUND IN THE WORK AREA NOT WEARING THE REQUIRED RESPIRATORY PROTECTION SHALL BE REMOVED FROM THE PROJECT SITE AND NOT BE PERMITTED TO RETURN.**
- 14.10 THE CONTRACTOR SHALL HAVE AT LEAST TWO (2) POWERED AIR PURIFYING RESPIRATORS STORED ON SITE DESIGNATED FOR AUTHORIZED VISITORS USE. APPROPRIATE RESPIRATOR FILTERS FOR AUTHORIZED VISITORS SHALL BE MADE AVAILABLE BY THE CONTRACTOR.**

DELIVERY AND STORAGE

- 15.1 DELIVER ALL MATERIALS TO THE JOB SITE IN ORIGINAL PACKAGES WITH CONTAINERS BEARING MANUFACTURER'S NAME AND LABEL.**
- 15.2 STORE ALL MATERIALS AT THE JOB SITE IN A SUITABLE AND DESIGNATED AREA.**
- A. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
 - B. Protect materials from unintended contamination and theft.
 - C. Storage areas shall be kept clean and organized.
- 15.3 REMOVE DAMAGED OR DETERIORATED MATERIALS FROM THE JOB SITE. MATERIALS CONTAMINATED WITH ASBESTOS SHALL BE DISPOSED OF AS ASBESTOS DEBRIS AS HEREIN SPECIFIED.**

TEMPORARY UTILITIES

- 16.1 SHUT DOWN AND LOCK OUT ALL ELECTRICAL POWER TO THE ASBESTOS WORK AREAS.**
- 16.2 PROVIDE TEMPORARY 120-240 VOLT, SINGLE PHASE, THREE WIRE, 100 AMP ELECTRIC SERVICE WITH GROUND FAULT CIRCUIT INTERRUPTERS (GFCI) FOR ALL ELECTRIC REQUIREMENTS WITHIN THE ASBESTOS WORK AREA.**
- A. Where available, obtain from Owner's existing system. Otherwise provide power from other sources (i.e. generator).
 - B. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all HEPA equipment and tools.
 - C. Provide wiring and receptacles as required by the Environmental Consultant for air sampling equipment.
 - D. All power to the Work Area shall be brought in from outside the area through GFIC's at the source.
- 16.3 PROVIDE TEMPORARY LIGHTING WITH "WEATHERPROOF" FIXTURES FOR ALL WORK AREAS INCLUDING DECONTAMINATION CHAMBERS.**
- A. The entire Work Area shall be kept illuminated at all times.
 - B. Provide lighting as required by the Environmental Consultant for the purposes of performing required inspections.

16.4 ALL TEMPORARY DEVICES AND WIRING USED IN THE WORK AREA SHALL BE CAPABLE OF DECONTAMINATION PROCEDURES INCLUDING HEPA VACUUMING AND WET-WIPING.

16.5 UTILIZE DOMESTIC WATER SERVICE, IF AVAILABLE, FROM OWNER'S EXISTING SYSTEM. PROVIDE HOT WATER HEATERS WITH SUFFICIENT CAPACITY TO MEET PROJECT DEMANDS, WHERE APPLICABLE.

PROJECT CONDITIONS

17.1 OWNER WILL OCCUPY PORTIONS OF BUILDING IMMEDIATELY ADJACENT TO ACM DEMOLITION AREA. CONDUCT ACM DEMOLITION SO OWNER'S OPERATIONS WILL NOT BE DISRUPTED.

17.2 CONDITIONS EXISTING AT TIME OF INSPECTION FOR BIDDING PURPOSE WILL BE MAINTAINED BY OWNER AS FAR AS PRACTICAL.

17.3 NOTIFY ARCHITECT OF DISCREPANCIES BETWEEN EXISTING CONDITIONS AND DRAWINGS BEFORE PROCEEDING WITH ACM DEMOLITION.

17.4 UTILITY SERVICE: MAINTAIN EXISTING UTILITIES INDICATED TO REMAIN IN SERVICE AND PROTECT THEM AGAINST DAMAGE DURING ACM DEMOLITION OPERATIONS.

A. Maintain fire-protection facilities in service during ACM demolition operations.

17.5 THE WORK PRACTICE OF "WRAP AND CUT" WILL NOT BE PERMITTED AS A SOLE MEASURE OF REMOVAL WITHOUT PROPER CONTAINMENT BARRIERS IN PLACE IN ANY AREAS THAT WILL BE REOCCUPIED AFTER THE ABATEMENT WORK IS COMPLETE.

17.6 CHANGE ORDERS DUE TO VARIANCES: ANY VARIANCE TO REGULATORY REQUIREMENTS SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE REGULATORY AGENCY SHALL BE EXECUTED UPON APPROVAL BY THE OWNER PURSUANT TO REVIEW OF CHANGE IN SCOPE OF WORK AND CHANGE IN CONTRACT COST RESULTING IN CREDIT.

A. Change Orders shall be prepared and issued in accordance with Division 01 Section "Contract Modification Procedures."

B. Variances which include the use of a remote personal decontamination enclosure system for interior abatement will not be permitted when asbestos removal includes friable material other than vinyl asbestos tile or approved glove bag operations.

17.7 RECORDKEEPING: COMPLY WITH REGULATORY REQUIREMENTS.

17.8 PREDEMOLITION CONFERENCE: CONDUCT CONFERENCE AT PROJECT SITE TO COMPLY WITH REQUIREMENTS IN DIVISION 01 SECTION "PROJECT MANAGEMENT AND COORDINATION."

SPECIAL JOB CONDITIONS

18.1 ANY SPECIAL JOB CONDITIONS, INCLUDING VARIANCES OBTAINED BY THE OWNER OR THE CONTRACTOR, SHALL BE ADHERED TO BY THE CONTRACTOR.

18.2 WRAP AND CUT METHOD OF REMOVAL WILL NOT BE PERMITTED ANYWHERE ON THIS PROJECT WITHOUT PRIOR CONSENT. ALL WRAP AND CUT REMOVALS SHALL BE DONE WITHIN AN AREA UNDER FULL CONTAINMENT.

WARRANTY

19.1 EXISTING WARRANTIES: REMOVE, REPLACE, PATCH, AND REPAIR MATERIALS AND SURFACES CUT OR DAMAGED DURING ACM DEMOLITION, BY METHODS AND WITH MATERIALS SO AS NOT TO VOID EXISTING WARRANTIES.

PART 1 PRODUCTS

PROTECTIVE CLOTHING

21.1 PROVIDE PERSONNEL UTILIZED DURING THE PROJECT WITH DISPOSABLE PROTECTIVE WHOLE BODY CLOTHING, HEAD COVERINGS, GLOVES AND FOOT COVERINGS. PROVIDE DISPOSABLE PLASTIC OR RUBBER GLOVES TO PROTECT HANDS. CLOTH GLOVES MAY BE WORN INSIDE THE PLASTIC OR RUBBER FOR COMFORT, BUT SHALL NOT BE USED ALONE. MAKE SLEEVES SECURE AT THE WRISTS AND MAKE FOOT COVERINGS SECURE AT THE ANKLES BY THE USE OF TAPE, OR PROVIDE DISPOSABLE COVERINGS WITH ELASTIC WRISTS OR TOPS.

21.2 PROVIDE SUFFICIENT QUANTITIES OF PROTECTIVE CLOTHING TO ASSURE A MINIMUM OF FOUR (4) COMPLETE DISPOSABLE OUTFITS PER DAY FOR EACH INDIVIDUAL PERFORMING ABATEMENT WORK.

21.3 EYE PROTECTION AND HARD HATS SHALL BE PROVIDED AND MADE AVAILABLE FOR ALL PERSONNEL ENTERING ANY WORK AREA.

21.4 AUTHORIZED VISITORS SHALL BE PROVIDED WITH SUITABLE PROTECTIVE CLOTHING, HEADGEAR, EYE PROTECTION, AND FOOTWEAR WHENEVER THEY ENTER THE WORK AREA.

SIGNS AND LABELS

22.1 PROVIDE WARNING SIGNS AND BARRIER TAPES AT ALL APPROACHES TO ASBESTOS WORK AREAS. LOCATE SIGNS AT SUCH DISTANCE THAT PERSONNEL MAY READ THE SIGN AND TAKE THE NECESSARY PROTECTIVE STEPS REQUIRED BEFORE ENTERING THE AREA.

A. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

- 1)
- 2) DANGER
- 3) ASBESTOS CANCER AND LUNG DISEASE
- 4) HAZARD
- 5) AUTHORIZED PERSONNEL ONLY
- 6) RESPIRATORS AND PROTECTIVE CLOTHING
- 7) ARE REQUIRED IN THIS AREA
- 8)

- B. Provide 3" wide yellow barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' AFF.
- 22.2 PROVIDE ASBESTOS DANGER LABELS AFFIXED TO ALL ASBESTOS MATERIALS, SCRAP, WASTE, DEBRIS AND OTHER PRODUCTS CONTAMINATED WITH ASBESTOS.**
- A. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:
- 1)
 - 2) DANGER
 - 3) CONTAINS ASBESTOS FIBERS
 - 4) AVOID CREATING DUST
 - 5) CANCER AND LUNG DISEASE HAZARD
 - 6)
- B. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172:
- 1)
 - 2) RQ HAZARDOUS
 - 3) SUBSTANCE
 - 4) SOLID, NOS
 - 5) ORM-E, NA 9188
 - 6) ASBESTOS
 - 7)
- C. Generator identification information shall be affixed to each waste container indicating the following printed in indelible ink:
- 1) Generator Name:
 - 2) Facility Name:
 - 3) Facility Address:

PROJECT LOG BOOK

- 23.1 PROVIDE A PERMANENTLY BOUND PROJECT LOG BOOK. LOG BOOK SHALL CONTAIN ON TITLE PAGE THE PROJECT NAME, NAME, ADDRESS AND PHONE NUMBER OF OWNER; NAME, ADDRESS AND PHONE NUMBER OF ENVIRONMENTAL CONSULTANT; NAME, ADDRESS AND PHONE NUMBER OF ABATEMENT CONTRACTOR; EMERGENCY NUMBERS INCLUDING, BUT NOT LIMITED TO LOCAL FIRE/RESCUE DEPARTMENT.**
- 23.2 ALL ENTRIES INTO THE LOG SHALL BE MADE IN NON-WASHABLE, PERMANENT INK AND SUCH PEN SHALL BE STRUNG TO OR OTHERWISE ATTACHED TO THE LOG TO PREVENT REMOVAL FROM THE LOG-IN AREA. UNDER NO CIRCUMSTANCES SHALL PENCIL ENTRIES BE PERMITTED.**
- 23.3 ALL PERSONS ENTERING AND EXITING THE WORK AREA SHALL SIGN THE LOG AND INCLUDE NAME, SOCIAL SECURITY NUMBER, AND TIME EACH TIME THEY ENTER THE WORK AREA.**
- 23.4 THE PROJECT SUPERVISOR SHALL DOCUMENT ALL WORK PERFORMED DAILY AND NOTE ALL INSPECTIONS REQUIRED BY NYS INDUSTRIAL CODE RULE 56, I.E. TESTING AND INSPECTION OF BARRIERS AND ENCLOSURES.**

SCAFFOLDING AND LADDERS

- 24.1 PROVIDE ALL SCAFFOLDING AND/OR STAGING AS NECESSARY TO ACCOMPLISH THE WORK OF THIS CONTRACT. SCAFFOLDING MAY BE OF SUSPENSION TYPE OR STANDING TYPE SUCH AS METAL TUBE AND COUPLER, TUBULAR WELDED FRAME, POLE OR OUTRIGGER TYPE OR CANTILEVER TYPE. THE TYPE, ERECTION AND USE OF ALL SCAFFOLDING AND LADDERS SHALL COMPLY WITH ALL APPLICABLE OSHA CONSTRUCTION INDUSTRY STANDARDS.**
- 24.2 PROVIDE SCAFFOLDING AND LADDERS AS REQUIRED BY THE ENVIRONMENTAL CONSULTANT FOR THE PURPOSES OF PERFORMING REQUIRED INSPECTIONS.**

SURFACTANT (AMENDED WATER)

- 25.1 WET ALL ASBESTOS-CONTAINING MATERIALS PRIOR TO REMOVAL WITH SURFACTANT MIXED AND APPLIED IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS.**
- 25.2 APPROVED MANUFACTURER:**
- A. International Protective Coatings Corp.: Serpiflex Shield
 - B. American Coatings Corp.: EPA 55 Asbestos Removal Agent
 - C. Certified Technologies: CerTane 2075 Penetrating Surfactant
 - D. Contractor may submit equal. Owner's Representative shall have final approval of equals.

ENCAPSULANT

- 26.1 ENCAPSULANT SHALL BE TINTED OR PIGMENTED SO THAT APPLICATION WHEN DRY IS READILY DISCERNIBLE.**
- 26.2 APPROVED MANUFACTURER:**
- A. International Protective Coatings Corp.: Serpiflex Shield
 - B. American Coatings Corp.: FNE High Temperature Sealant
 - C. Certified Technologies: CerTane 1000 Post Removal Encapsulant
 - D. Contractor may submit equal. Owner's Representative shall have final approval of equals.

DISPOSAL BAGS, DRUMS, AND CONTAINERS

- 27.1 PROVIDE 6 MIL POLYETHYLENE DISPOSAL BAGS PRINTED WITH ASBESTOS CAUTION LABELS. BAGS SHALL ALSO BE IMPRINTED WITH U.S. DEPARTMENT OF TRANSPORTATION REQUIRED MARKINGS.**
- 27.2 PROVIDE 30 OR 55 GALLON CAPACITY FIBER OR METAL DRUMS CAPABLE OF BEING SEALED AIR AND WATER TIGHT IF ASBESTOS WASTE HAS THE POTENTIAL TO DAMAGE OR PUNCTURE DISPOSAL BAGS. AFFIX ASBESTOS CAUTION LABELS ON LIDS AND AT ONE-THIRD POINTS AROUND DRUM CIRCUMFERENCE TO ASSURE READY IDENTIFICATION.**
- 27.3 CONTAINERS AND BAGS MUST BE LABELED WITH THE NAMES OF THE WASTE GENERATOR AND THE LOCATION AT WHICH THE WASTE WAS GENERATED IN ACCORDANCE WITH 40 CFR PART 61 NESHAPS.**
- 27.4 LABELED ACM WASTE CONTAINERS OR BAGS SHALL NOT BE USED FOR NON-ACM WASTE OR TRASH. ANY MATERIAL PLACED IN LABELED CONTAINERS OR BAGS, WHETHER TURNED INSIDE OUT OR NOT SHALL BE HANDLED AND DISPOSED OF AS ACM WASTE.**

HEPA VACUUM EQUIPMENT

- 28.1 ALL DRY VACUUMING PERFORMED UNDER THIS CONTRACT SHALL BE PERFORMED WITH HIGH EFFICIENCY PARTICULATE ABSOLUTE (HEPA) FILTER EQUIPPED INDUSTRIAL VACUUMS CONFORMING TO ANSI Z9.2.**
- 28.2 PROVIDE TOOLS AND SPECIALIZED EQUIPMENT INCLUDING SCRAPING NOZZLES WITH INTEGRAL VACUUM HOODS CONNECTED TO A HEPA VACUUM WITH FLEXIBLE HOSE.**
- 28.3 APPROVED MANUFACTURERS:**
- A. Hako Minuteman
 - B. Micro-Trap Inc.
 - C. Control Resource Systems, Inc.
 - D. Contractor may submit equal. Owner's Representative shall have final approval of equals.

POWER TOOLS

29.1 ANY POWER TOOLS USED TO DRILL, CUT INTO, OR OTHERWISE DISTURB ASBESTOS MATERIAL SHALL BE EQUIPPED WITH HEPA FILTERED LOCAL EXHAUST VENTILATION.

POLYETHYLENE SHEETING

30.1 ALL POLYETHYLENE (PLASTIC) SHEETING USED ON THE PROJECT (INCLUDING BUT NOT LIMITED TO SHEETING USED FOR CRITICAL AND ISOLATION BARRIERS, FIXED OBJECTS, WALLS, FLOORS, CEILINGS, WASTE CONTAINER) SHALL BE AT LEAST 6 MIL FIRE RETARDANT SHEETING.

30.2 DECONTAMINATION ENCLOSURE SYSTEMS SHALL UTILIZE AT LEAST 6 MIL OPAQUE FIRE RETARDANT PLASTIC SHEETING. AT LEAST 2 LAYERS OF 6 MIL REINFORCED FIRE RETARDANT PLASTIC SHEETING SHALL BE USED FOR THE FLOORING.

PART 1 EXECUTION

EXAMINATION

32.1 SURVEY EXISTING CONDITIONS AND CORRELATE WITH REQUIREMENTS INDICATED TO DETERMINE EXTENT OF ACM DEMOLITION REQUIRED.

PREPARATION

33.1 SITE ACCESS AND TEMPORARY CONTROLS: CONDUCT ACM DEMOLITION AND REMOVAL OPERATIONS TO ENSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS, WALKWAYS, AND OTHER ADJACENT OCCUPIED AND USED FACILITIES.

- A. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Comply with Regulatory Requirements for access and protection to work areas.
- C. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

GENERAL DEMOLITION REQUIREMENTS

34.1 DEMOLISH AND REMOVE EXISTING CONSTRUCTION ONLY TO THE EXTENT REQUIRED BY ACM REMOVAL PROCEDURES, TO ACCOMMODATE NEW CONSTRUCTION AND AS INDICATED. USE METHODS REQUIRED TO COMPLETE THE WORK WITHIN LIMITATIONS OF REGULATORY REQUIREMENTS AND AS FOLLOWS:

- A. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage existing construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and contamination during ACM demolition in accordance with Regulatory Requirements. When permitted by Architect, items deemed uncontaminated by Regulatory Requirements may be removed to a suitable, protected storage location prior to ACM demolition and cleaned and reinstalled in their original locations after ACM demolition operations are complete.

GENERAL REQUIREMENTS FOR ABATEMENT WORK

- 35.1 SHOULD THE AREA BEYOND THE WORK AREA(S) BECOME CONTAMINATED WITH ASBESTOS CONTAINING MATERIALS OR ELEVATED FIBER LEVELS IMMEDIATELY STOP WORK AND INSTITUTE EMERGENCY PROCEDURES. CONTAMINATED NON-WORK AREAS SHALL BE ISOLATED AND DECONTAMINATED IN ACCORDANCE WITH PROCEDURES ESTABLISHED FOR ASBESTOS REMOVAL. ALL COSTS INCURRED IN DECONTAMINATING SUCH NON-WORK AREAS AND THE CONTENTS THEREOF SHALL BE BORNE BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.**
- 35.2 MEDICAL APPROVAL, FIT TEST REPORTS, WORKER ACKNOWLEDGMENTS, AND NYS DOL CERTIFICATES SHALL BE ON SITE PRIOR TO ADMITTANCE OF ANY CONTRACTOR'S EMPLOYEES TO THE ASBESTOS WORK AREA.**
- 35.3 PERFORM ALL ASBESTOS REMOVAL WORK USING WET REMOVAL PROCEDURES. MIX AND APPLY SURFACTANT IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. DRY REMOVAL PROCEDURES ARE NOT PERMITTED. SEQUENTIAL ABATEMENT OF MULTIPLE TYPES OF ACM WITHIN A WORK AREA SHALL BE FOLLOWED BY PERFORMING "TOP-DOWN" ABATEMENT: MOST FRIABLE TO LEAST FRIABLE. COMPLETE CLEANING AT CONCLUSION OF EACH ABATEMENT TYPE AND SUBSEQUENT CLEARANCE SAMPLING IS REQUIRED PER AMENDED ICR-56.**
- 35.4 THE FOLLOWING SUBMITTALS, DOCUMENTATION, AND POSTINGS SHALL BE MAINTAINED ON-SITE DURING ABATEMENT ACTIVITIES AT A LOCATION APPROVED BY THE ASBESTOS PROJECT MONITOR:**
- A. Contractor license issued by New York State Department of Labor.
 - B. Certification, Worker Training, Medical Surveillance, Acknowledgments:
 - 1. New York State Asbestos Handler certification cards for each person employed in the removal, handling, or disturbance of asbestos.
 - 2. Evidence that Workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
 - 3. Documentation that Workers have been fit tested specifically for respirators used on the Project.
 - 4. Worker's Acknowledgments: Statements signed by each employee that the employee has received training in the proper handling of asbestos containing materials; understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.
 - C. Daily OSHA personal air monitoring results.
 - D. NYS Department of Health ELAP certification for the laboratory that will be analyzing the OSHA personnel air samples.
 - E. NYS Department of Environmental Conservation Waste Transporter Permit.
 - F. Project documents (specifications and drawings.)
 - G. Notifications and variances (site specific and applicable.) Ensure that the most up-to-date notifications and variances are on-site.
 - H. Applicable regulations.
 - I. Material Safety Data Sheets of supplies/chemicals used on the Project.
 - J. Approved Abatement Work Plan.
 - K. List of emergency telephone numbers.

L. Waste Disposal Log

M. Project Log Book

**35.5 THE WORK AREA MUST BE VACATED BY BUILDING OCCUPANTS PRIOR TO
DECONTAMINATION ENCLOSURE CONSTRUCTION AND WORK AREA
PREPARATION.**

1)

35.6 ALL DEMOLITION NECESSARY TO ACCESS ASBESTOS CONTAINING MATERIALS FOR REMOVAL MUST BE CONDUCTED WITHIN NEGATIVE PRESSURE ENCLOSURES BY LICENSED ASBESTOS HANDLERS. DEMOLITION DEBRIS MAY BE DISPOSED OF AS CONSTRUCTION AND DEMOLITION DEBRIS PROVIDED THE ASBESTOS PROJECT MONITOR DETERMINES THAT IT IS NOT CONTAMINATED WITH ASBESTOS. IF THE DEMOLITION DEBRIS IS DETERMINED TO BE CONTAMINATED, IT MUST BE DISPOSED OF AS ASBESTOS WASTE.

PERSONNEL DECONTAMINATION ENCLOSURE

36.1 PROVIDE A PERSONNEL DECONTAMINATION ENCLOSURE CONTIGUOUS TO THE WORK AREA, WHERE APPLICABLE. THE DECONTAMINATION ENCLOSURE SHALL BE ATTACHED TO THE WORK AREA AND NOT LOCATED WITHIN IT. IF THE DECONTAMINATION CHAMBER IS ACCESSIBLE TO THE PUBLIC IT SHALL BE FULLY FRAMED AND SHEATHED TO PREVENT UNAUTHORIZED ENTRY.

36.2 ACCESS TO THE WORK AREA WILL BE FROM THE CLEAN ROOM THROUGH AN AIR-LOCK TO THE SHOWER, THROUGH AN AIR LOCK TO THE EQUIPMENT ROOM, THROUGH AN AIR LOCK TO THE WORK AREA. EACH AIRLOCK SHALL BE A MINIMUM OF THREE FEET FROM DOOR TO DOOR.

36.3 THE DECONTAMINATION ENCLOSURE CEILING AND WALLS SHALL BE COVERED WITH TWO LAYERS OF OPAQUE 6 MIL POLYETHYLENE SHEETING. TWO LAYERS OF REINFORCED POLYETHYLENE SHEETING SHALL BE USED TO COVER THE FLOOR.

36.4 ESTABLISH A TRIPLE LAYER OF SIX MIL POLYETHYLENE AT THE DECONTAMINATION CHAMBER DOORWAYS, WEIGHTED TO INSURE A TIGHT SEAL OF THE ENCLOSURE. PRIOR TO ESTABLISHING DOORWAY SEALS MOVE ALL REQUIRED TOOLS, SCAFFOLDING, AND EQUIPMENT INTO THE WORK AREA.

36.5 THE ENTRANCE TO THE CLEAN ROOM SHALL HAVE A LOCKABLE DOOR. PROVIDE SUITABLE LOCKERS FOR STORAGE OF WORKER'S STREET CLOTHES. STORAGE FOR RESPIRATORS ALONG WITH REPLACEMENT FILTERS AND DISPOSABLE TOWELS SHALL ALSO BE PROVIDED.

36.6 PROVIDE A TEMPORARY SHOWER WITH INDIVIDUAL HOT AND COLD WATER SUPPLIES AND FAUCETS. PROVIDE A SUFFICIENT SUPPLY OF SOAP AND SHAMPOO. THERE SHALL BE ONE SHOWER FOR EVERY SIX WORKERS. THE SHOWER ROOM SHALL BE CONSTRUCTED IN SUCH A WAY SO THAT TRAVEL THROUGH THE SHOWER CHAMBER SHALL BE THROUGH THE SHOWER. THE SHOWER SHALL NOT BE ABLE TO BE BYPASSED.

36.7 SHOWER WATER SHALL BE DRAINED, COLLECTED AND FILTERED THROUGH A SYSTEM WITH AT LEAST A 5.0 MICRON PARTICLE SIZE COLLECTION CAPABILITY CONTAINING A SERIES OF SEVERAL FILTERS WITH PROGRESSIVELY SMALLER PORE SIZES TO AVOID RAPID CLOGGING OF THE SYSTEM. THE FILTERED WASTE WATER SHALL THEN BE DISCHARGED IN ACCORDANCE WITH APPLICABLE CODES AND THE CONTAMINATED FILTERS DISPOSED OF AS ASBESTOS WASTE.

36.8 THE EQUIPMENT ROOM SHALL BE USED FOR THE STORAGE OF TOOLS AND EQUIPMENT. A WALK-OFF PAN FILLED WITH WATER SHALL BE LOCATED IN THE WORK AREA OUTSIDE THE EQUIPMENT ROOM FOR WORKERS TO CLEAN FOOT COVERINGS WHEN LEAVING THE WORK AREA. A LABELED 6 MIL PLASTIC ACM WASTE BAG FOR COLLECTION OF CONTAMINATED CLOTHING SHALL BE LOCATED IN THIS ROOM.

36.9 THE PERSONAL DECONTAMINATION ENCLOSURE SHALL BE CLEANED AND DISINFECTED MINIMALLY AT THE END OF EACH WORK SHIFT AND AS OTHERWISE DIRECTED BY THE ASBESTOS PROJECT MONITOR.

WASTE DECONTAMINATION ENCLOSURE

- 37.1 PROVIDE A WASTE DECONTAMINATION ENCLOSURE CONTIGUOUS TO THE WORK AREA. THE DECONTAMINATION ENCLOSURE SHALL BE ATTACHED TO THE WORK AREA AND NOT LOCATED WITHIN IT. IF THE DECONTAMINATION CHAMBER IS ACCESSIBLE TO THE PUBLIC IT SHALL BE FULLY FRAMED AND SHEATHED TO PREVENT UNAUTHORIZED ENTRY.**
- 37.2 THE WASTE DECONTAMINATION ENCLOSURE SYSTEM SHALL CONSIST OF A WASHROOM/CLEANUP ROOM WITH AN AIRLOCK TO THE WORK AREA AND ANOTHER AIRLOCK DOORWAY TO THE HOLDING AREA. EACH AIRLOCK SHALL BE A MINIMUM OF THREE FEET FROM DOOR TO DOOR. THE ENTRANCE TO THE HOLDING AREA SHALL HAVE A LOCKABLE DOOR.**
- 37.3 THE DECONTAMINATION ENCLOSURE CEILING AND WALLS SHALL BE COVERED WITH TWO LAYERS OF OPAQUE 6 MIL POLYETHYLENE SHEETING. TWO LAYERS OF REINFORCED POLYETHYLENE SHEETING SHALL BE USED TO COVER THE FLOOR.**
- 37.4 ESTABLISH A TRIPLE LAYER OF SIX MIL POLYETHYLENE AT THE DECONTAMINATION CHAMBER DOORWAYS, WEIGHTED TO INSURE A TIGHT SEAL OF THE ENCLOSURE. PRIOR TO ESTABLISHING DOORWAY SEALS MOVE ALL REQUIRED TOOLS, SCAFFOLDING, AND EQUIPMENT INTO THE WORK AREA.**
- 37.5 WHERE THERE IS ONLY ONE EGRESS FROM THE WORK AREA, THE HOLDING AREA OF THE WASTE DECONTAMINATION ENCLOSURE SYSTEM MAY BRANCH OFF FROM THE PERSONNEL DECONTAMINATION ENCLOSURE EQUIPMENT ROOM, WHICH THEN SERVES AS THE WASTE WASH ROOM.**
- 37.6 THE WASTE WASH ROOM WATER SHALL BE DRAINED, COLLECTED, AND FILTERED THROUGH A SYSTEM WITH AT LEAST A 5.0 MICRON PARTICLE SIZE COLLECTION CAPABILITY CONTAINING A SERIES OF SEVERAL FILTERS WITH PROGRESSIVELY SMALLER PORE SIZES TO AVOID RAPID CLOGGING OF THE SYSTEM. THE FILTERED WASTE WATER SHALL THEN BE DISCHARGED IN ACCORDANCE WITH APPLICABLE CODES AND THE CONTAMINATED FILTERS DISPOSED OF AS ASBESTOS WASTE.**
- 37.7 IN SMALL ASBESTOS PROJECTS WHERE ONLY ONE EGRESS FROM THE WORK AREA EXISTS, THE SHOWER ROOM MAY BE USED AS A WASTE WASHROOM. IN THIS INSTANCE, THE CLEAN ROOM SHALL NOT BE USED FOR WASTE STORAGE, BUT SHALL BE USED FOR WASTE TRANSFER TO CARTS, WHICH SHALL IMMEDIATELY BE REMOVED FROM THIS ENCLOSURE.**

WORK AREA ENTRY AND EXIT PROCEDURES

- 38.1 ACCESS TO AND FROM THE ASBESTOS WORK AREA IS PERMITTED ONLY THROUGH THE PERSONNEL DECONTAMINATION ENCLOSURE UNLESS OTHERWISE STIPULATED IN A SITE SPECIFIC OR APPLICABLE VARIANCE.**
- 38.2 WORKERS SHALL SIGN THE ENTRY/EXIT LOG UPON EVERY ENTRY AND EXIT.**
- 38.3 THE FOLLOWING PROCEDURES SHALL BE FOLLOWED WHEN ENTERING THE WORK AREA:**
- A. Before entering the Work Area, Workers shall proceed to the clean room, remove all street clothes, and don protective clothing, equipment, and respirators.

- B. Workers shall proceed from the clean room through the shower room and the equipment room and into the Work Area.

38.4 THE FOLLOWING PROCEDURES SHALL BE FOLLOWED WHEN EXITING THE WORK AREA:

- A. Before leaving the Work Area, gross asbestos contamination will be removed by brushing, wet cleaning and/or HEPA vacuuming.
- B. In the equipment room, Workers shall remove disposable clothing, but not respirators, and shall place clothing in plastic disposal bags for disposal as contaminated debris prior to entering the shower room.
- C. Workers shall shower thoroughly while wearing respirators then wash respirator with soap and water prior to removal.
- D. Upon exiting the shower, Workers shall don new disposable clothing if the Work shift is to continue or street clothes to exit area. Under no circumstances shall Workers enter public non-Work Areas in disposable protective clothing.

WORK AREA PREPARATION

- 39.1 ASBESTOS DANGER SIGNS SHALL BE POSTED AT ALL APPROACHES TO THE ASBESTOS WORK AREA. POST ALL EMERGENCY EXITS AS EMERGENCY EXITS ONLY ON THE WORK AREA SIDE, POST WITH ASBESTOS CAUTION SIGNS ON THE NON-WORK AREA SIDE. PROVIDE ALL NON-WORK AREA STAIRS AND CORRIDORS ACCESSIBLE TO THE ASBESTOS WORK AREA WITH WARNING TAPES AT THE BASE OF STAIRS AND BEGINNING OF CORRIDORS. WARNING TAPES SHALL BE IN ADDITION TO CAUTION SIGNS.**
- 39.2 SHUT DOWN AND LOCK OUT THE BUILDING HEATING, VENTILATING, AND AIR CONDITIONING AND ELECTRICAL SYSTEMS. PROVIDE TEMPORARY ELECTRIC POWER AND LIGHTING AS SPECIFIED HEREIN.**
- 39.3 ALL SURFACES AND OBJECTS WITHIN THE WORK AREA SHALL BE PRE-CLEANED USING HEPA VACUUMING AND/OR WET-WIPING METHODS. DRY SWEEPING AND ANY OTHER METHODS THAT RAISE DUST ARE PROHIBITED. ACM SHALL NOT BE DISTURBED DURING PRE-CLEANING.**
- 39.4 MOVABLE OBJECTS WITHIN THE WORK AREA SHALL BE HEPA VACUUMED AND/OR WET-WIPED AND REMOVED FROM THE WORK AREA.**
- 39.5 ALL NON-MOVABLE EQUIPMENT IN THE WORK AREA SHALL BE COMPLETELY COVERED WITH 2 LAYERS OF POLYETHYLENE SHEETING, AT LEAST 6 MIL IN THICKNESS, AND SECURED IN PLACE WITH DUCT TAPE AND/OR SPRAY ADHESIVE.**
- 39.6 PROVIDE ENCLOSURE OF THE ASBESTOS WORK AREA NECESSARY TO ISOLATE IT FROM UNSEALED AREAS OF THE BUILDING IN ACCORDANCE WITH THE APPROVED ASBESTOS WORK PLAN AND AS SPECIFIED HEREIN.**
- 39.7 SEAL OFF ALL OPENINGS INCLUDING BUT NOT LIMITED TO WINDOWS, DIFFUSERS, GRILLS, ELECTRICAL OUTLETS AND BOXES, DOORS, FLOOR DRAINS, AND ANY OTHER PENETRATIONS OF THE WORK AREA ENCLOSURE, USING 2 LAYERS OF AT LEAST 6 MIL POLYETHYLENE SHEETING TO FORM A CRITICAL BARRIER.**
- 39.8 PROVIDE TEMPORARY FRAMING AND SHEATHING AT OPENINGS LARGER THAN 32 SQUARE FEET FORMING THE LIMITS OF THE ASBESTOS WORK AREA. SHEATHING THICKNESS MUST BE A MINIMUM OF 3/8 INCH AND ALL SHEATHING SHALL BE CAULKED AND THE WORK AREA SIDE SEALED WITH TWO LAYERS OF 6 MIL POLYETHYLENE SHEETING TO FORM AN ISOLATION BARRIER.**
- 39.9 ISOLATION BARRIERS SHALL BE INSTALLED AT ALL ELEVATOR OPENINGS IN THE WORK AREA. ELEVATOR CONTROLS SHALL BE MODIFIED SO THAT ELEVATORS BYPASS THE WORK AREA.**
- 39.10 PROVIDE TWO LAYERS OF 6 MIL POLYETHYLENE SHEETING OVER ALL FLOOR, WALL, AND CEILING SURFACES. ISOLATION BARRIERS SHALL ALSO BE COVERED WITH TWO LAYERS (FOR A TOTAL OF FOUR LAYERS). SHEETING SHALL BE SECURED WITH SPRAY ADHESIVE AND THEN SEALED WITH DUCT TAPE. ALL JOINTS IN POLYETHYLENE SHEETING SHALL OVERLAP 12" MINIMUM.**

- 39.11 UNLESS OTHERWISE SPECIFIED FOR REMOVAL, THE CONTRACTOR SHALL EITHER PROTECT ALL FIBERGLASS INSULATION ON PIPING, DUCTWORK, TANKS, ETC. IN THE WORK AREA USING TWO LAYERS OF SIX MIL POLYETHYLENE OR REMOVE THE INSULATION AS ASBESTOS CONTAINING WASTE. IF THE CONTRACTOR ELECTS TO REMOVE THE FIBERGLASS INSULATION, HE SHALL BE RESPONSIBLE FOR REINSULATION IF REINSULATION OF REMOVED ACM IS PART OF THE CONTRACT OR PROJECT.**
- 39.12 FRAME OUT EMERGENCY EXITS. PROVIDE DOUBLE LAYER 6 MIL POLYETHYLENE SHEETING AND TAPE SEAL OPENING. POST AS EMERGENCY EXITS ONLY. WITHIN THE WORK AREA, MARK THE LOCATIONS AND DIRECTIONS OF EMERGENCY EXITS THROUGHOUT THE WORK AREA USING EXIT SIGNS AND/OR DUCT TAPE.**
- 39.13 REMOVE ALL ITEMS ATTACHED TO OR IN CONTACT WITH ACM ONLY AFTER THE WORK AREA ENCLOSURE IS IN PLACE. HEPA VACUUM AND WET WIPE WITH AMENDED WATER ALL REMOVED ITEMS PRIOR TO THEIR REMOVAL FROM THE WORK AREA AND BEFORE THE START OF ASBESTOS REMOVAL OPERATIONS.**
- 39.14 SUSPENDED CEILING TILES SHALL ONLY BE REMOVED AFTER WORK AREA PREPARATION IS COMPLETE. NON-CONTAMINATED CEILING TILES SHALL BE HEPA VACUUMED AND REMOVED FROM THE WORK AREA BEFORE ASBESTOS REMOVALS BEGIN. CONTAMINATED CEILING TILES SHALL BE DISPOSED OF AS ASBESTOS WASTE.**

NEGATIVE AIR PRESSURE FILTRATION SYSTEM

- 40.1 PROVIDE A PORTABLE ASBESTOS FILTRATION SYSTEM THAT DEVELOPS A MINIMUM PRESSURE DIFFERENTIAL OF NEGATIVE 0.02 IN. OF WATER COLUMN WITHIN ALL FULL ENCLOSURE AREAS RELATIVE TO ADJACENT UNSEALED AREAS AND THAT PROVIDES A MINIMUM OF 4 AIR CHANGES PER HOUR IN THE WORK AREA DURING ABATEMENT, WHERE APPLICABLE.**
- 40.2 SUCH FILTRATION SYSTEMS MUST BE OPERATED 24 HOURS PER DAY DURING THE ENTIRE PROJECT UNTIL THE FINAL CLEANUP IS COMPLETED AND SATISFACTORY RESULTS OF THE FINAL AIR SAMPLES ARE RECEIVED FROM THE LABORATORY.**
- 40.3 THE SYSTEM SHALL INCLUDE A SERIES OF PRE-FILTERS AND FILTERS TO PROVIDE HIGH EFFICIENCY PARTICULATE AIR (HEPA) FILTRATION OF PARTICLES DOWN TO 0.3 MICRONS AT 100% EFFICIENCY AND BELOW 0.3 MICRONS AT 99.9% EFFICIENCY. PROVIDE SUFFICIENT REPLACEMENT FILTERS TO REPLACE PRE-FILTERS EVERY 2 HOURS, SECONDARY PRE-FILTERS EVERY 24 HOURS, AND PRIMARY HEPA FILTERS EVERY 600 HOURS OF OPERATION.**
- 40.4 A MINIMUM OF ONE ADDITIONAL FILTRATION UNIT OF AT LEAST THE SAME CAPACITY AS THE PRIMARY UNIT(S) SHALL BE INSTALLED AND FULLY FUNCTIONAL TO BE USED DURING PRIMARY UNIT (S) FILTER CHANGING AND IN CASE OF PRIMARY FAILURE. THERE SHALL BE AT LEAST ONE BACK-UP UNIT FOR EVERY FIVE PRIMARY UNITS.**
- 40.5 AT NO TIME WILL THE UNIT EXHAUST INDOORS, WITHIN 50 FEET OF A RECEPTOR, INCLUDING BUT NOT LIMITED TO WINDOWS AND DOORS, OR ADVERSELY AFFECT THE AIR INTAKE OF THE BUILDING.**

- 40.6 UPON ELECTRIC POWER FAILURE OR SHUT-DOWN OF ANY FILTRATION UNIT, ALL ABATEMENT ACTIVITIES SHALL STOP IMMEDIATELY AND ONLY RESUME AFTER POWER IS RESTORED AND ALL FILTRATION UNITS ARE FULLY OPERATING. FOR SHUT-DOWNS LONGER THAN ONE HOUR, ALL OPENINGS INTO THE WORK AREA, INCLUDING THE DECONTAMINATION ENCLOSURES, SHALL BE SEALED.**
- 40.7 DURING FINAL AIR CLEARANCE SAMPLING, NEGATIVE AIR FILTRATION SHALL BE REDUCED TO HALF THE REQUIRED AIR CHANGES PER HOUR.**
- 40.8 THE CONTRACTOR SHALL PROVIDE EITHER A MANOMETER OR A PHOTOHELIC STYLE NEGATIVE AIR PRESSURE GAUGE WITH CHART RECORDER TO MEASURE AND RECORD NEGATIVE PRESSURE DIFFERENTIAL ACROSS THE WORK AREA BARRIERS WITHOUT INTERRUPTION 24 HOURS PER DAY AS DIRECTED BY THE ENVIRONMENTAL CONSULTANT.**
- 40.9 THERE SHALL BE AT LEAST A 12 HOUR SETTLING PERIOD AFTER THE WORK AREA IS FULLY PREPARED AND THE NEGATIVE FILTRATION UNITS HAVE BEEN STARTED TO ENSURE INTEGRITY OF THE BARRIERS.**

REMOVAL OF ASBESTOS CONTAINING MATERIALS

- 41.1 ASBESTOS-CONTAINING MATERIALS SHALL BE REMOVED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND THE APPROVED ASBESTOS WORK PLAN.**
- 41.2 SUFFICIENTLY WET ASBESTOS MATERIALS WITH A LOW PRESSURE, AIRLESS FINE SPRAY OF SURFACTANT TO ENSURE FULL PENETRATION PRIOR TO MATERIAL REMOVAL. RE-WET MATERIAL THAT DOES NOT DISPLAY EVIDENCE OF SATURATION.**
- 41.3 ONE WORKER SHALL CONTINUOUSLY APPLY AMENDED WATER WHILE ACM IS BEING REMOVED.**
- 41.4 PERFORM CUTTING, DRILLING, ABRADING, OR ANY PENETRATION OR DISTURBANCE OF ASBESTOS CONTAINING MATERIAL IN A MANNER TO MINIMIZE THE DISPERSAL OF ASBESTOS FIBERS INTO THE AIR. USE EQUIPMENT AND METHODS SPECIFICALLY DESIGNED TO LIMIT GENERATION OF AIRBORNE ASBESTOS PARTICLES. ALL POWER OPERATED TOOLS USED SHALL BE PROVIDED WITH HEPA EQUIPPED FILTERED LOCAL EXHAUST VENTILATION.**
- 41.5 UPON REMOVAL OF ACM FROM THE SUBSTRATE, THE NEWLY EXPOSED SURFACES SHALL BE HEPA VACUUMED AND/OR WET CLEANED. SURFACES MUST BE THOROUGHLY CLEANED USING NECESSARY METHODS AND ANY REQUIRED SOLVENTS TO COMPLETELY REMOVE ANY ADHESIVE, MASTIC, ETC.**
- 41.6 ALL REMOVED MATERIAL SHALL BE PLACED INTO 6 MIL PLASTIC DISPOSAL BAGS OR OTHER SUITABLE CONTAINER UPON DETACHMENT FROM THE SUBSTRATE OR WHENEVER THERE IS ENOUGH ACCUMULATION TO FILL A SINGLE BAG OR CONTAINER. MAINTAIN THE SURFACES OF THE WORK AREA FREE OF ACCUMULATION OF ASBESTOS DEBRIS.**
- 41.7 DUST-TIGHT ENCLOSED INCLINED CHUTES SHALL BE USED FOR MATERIALS DROPPED FROM DISTANCES GREATER THAN 10 FT.**
- 41.8 LARGE COMPONENTS SHALL BE WRAPPED IN TWO LAYERS OF 6 MIL POLYETHYLENE SHEETING. SHARP COMPONENTS LIKELY TO TEAR DISPOSAL BAGS SHALL BE PLACED IN FIBER DRUMS OR BOXES AND THEN WRAPPED WITH SHEETING.**

- 41.9 POWER OR PRESSURE WASHERS ARE NOT PERMITTED FOR ASBESTOS REMOVAL OR CLEAN-UP PROCEDURES.**
- 41.10 ALL OPEN ENDS OF PIPE AND DUCT INSULATION NOT SCHEDULED FOR REMOVAL SHALL BE ENCAPSULATED USING LAG CLOTH.**
- 41.11 ALL CONSTRUCTION AND DEMOLITION DEBRIS DETERMINED BY THE ENVIRONMENTAL CONSULTANT TO BE CONTAMINATED WITH ASBESTOS SHALL BE HANDLED AND DISPOSED OF AS ASBESTOS WASTE.**
- 41.12 THE USE OF METAL SHOVELS, METAL DUST PANS, ETC. ARE NOT PERMITTED INSIDE THE WORK AREA.**

EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

- 42.1 EXTERNAL SURFACES OF CONTAMINATED CONTAINERS AND EQUIPMENT SHALL BE CLEANED BY WET CLEANING AND/OR HEPA VACUUMING IN THE WORK AREA BEFORE MOVING SUCH ITEMS INTO THE WASTE DECONTAMINATION ENCLOSURE SYSTEM AIRLOCK BY PERSONS ASSIGNED TO THIS DUTY. THE WORK AREA PERSONS SHALL NOT ENTER THE AIRLOCK.**
- 42.2 THE CONTAINERS AND EQUIPMENT SHALL BE REMOVED FROM THE AIRLOCK BY PERSONS STATIONED IN THE WASHROOM DURING WASTE REMOVAL OPERATIONS. THE EXTERNAL SURFACES OF CONTAINERS AND EQUIPMENT SHALL BE CLEANED A SECOND TIME BY WET CLEANING.**
- 42.3 THE CLEANED CONTAINERS OF ASBESTOS MATERIAL AND EQUIPMENT ARE TO BE DRIED OF ANY EXCESSIVE POOLED OR BEADED LIQUID, PLACED IN UNCONTAMINATED PLASTIC BAGS OR SHEETING, AS THE ITEM'S PHYSICAL CHARACTERISTICS DEMAND, AND SEALED AIRTIGHT.**
- 42.4 THE CLEAN RE-CONTAINERIZED ITEMS SHALL BE MOVED INTO THE AIRLOCK THAT LEADS TO THE HOLDING AREA. WORKERS IN THE WASHROOM SHALL NOT ENTER THIS AIRLOCK OR THE WORK AREA UNTIL WASTE REMOVAL IS FINISHED FOR THAT PERIOD.**
- 42.5 CONTAINERS AND EQUIPMENT SHALL BE MOVED FROM THE AIRLOCK AND INTO THE HOLDING AREA BY PERSONS DRESSED IN CLEAN PERSONAL PROTECTIVE EQUIPMENT, WHO HAVE ENTERED FROM UNCONTAMINATED AREAS.**
- 42.6 THE CLEANED CONTAINERS OF ASBESTOS MATERIAL AND EQUIPMENT SHALL BE PLACED IN WATER TIGHT CARTS WITH DOORS OR TOPS THAT SHALL BE CLOSED AND SECURED. THESE CARTS SHALL BE HELD IN THE HOLDING AREA PENDING REMOVAL. THE CARTS SHALL BE WET CLEANED AND/OR HEPA VACUUMED AT LEAST ONCE EACH DAY.**
- 42.7 THE EXIT FROM THE DECONTAMINATION ENCLOSURE SYSTEM SHALL BE SECURED TO PREVENT UNAUTHORIZED ENTRY.**
- 42.8 WHERE THE WASTE REMOVAL ENCLOSURE IS PART OF THE PERSONNEL DECONTAMINATION ENCLOSURE, WASTE REMOVAL SHALL NOT OCCUR DURING SHIFT CHANGES OR WHEN OTHERWISE OCCUPIED. PRECAUTIONS SHALL BE TAKEN TO PREVENT SHORT CIRCUITING AND CYCLING OF AIR OUTWARD THROUGH THE SHOWER AND CLEAN ROOM.**

APPLICATION OF ENCAPSULANT

- 43.1 FOLLOWING FIRST CLEANING AND PRIOR TO FIRST SHEETING REMOVAL, AND ONCE WORK AREA HAS BEEN RENDERED FREE OF VISIBLE RESIDUES; A THIN COAT OF ENCAPSULANT SHALL BE APPLIED TO ANY SURFACES IN THE WORK AREA WHICH WERE NOT THE SUBJECT OF REMOVAL.**
- 43.2 IN NO EVENT SHALL ENCAPSULANT BE APPLIED TO ANY SURFACE THAT WAS THE SUBJECT OF REMOVAL PRIOR TO OBTAINING SATISFACTORY AIR MONITORING RESULTS.**
- 43.3 ENCAPSULANTS SHALL BE PIGMENTED OR TINTED TO PROVIDE AN INDICATION FOR COMPLETENESS OF COVERAGE. THE ASBESTOS PROJECT MONITOR SHALL DETERMINE ADEQUACY OF COVERAGE.**

WORK AREA DECONTAMINATION

44.1 FOLLOWING COMPLETION OF GROSS ABATEMENT AND AFTER ALL ACCUMULATIONS OF ASBESTOS WASTE MATERIALS HAVE BEEN CONTAINERIZED, THE FOLLOWING DECONTAMINATION PROCEDURES SHALL BE FOLLOWED UNLESS MODIFIED BY A SITE SPECIFIC VARIANCE.

44.2 FIRST CLEANING:

- A. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
- B. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and may either be decontaminated prior to removal from the Work Area or disposed of as asbestos waste.
- C. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
- D. The Contractor shall then apply a thin coat of encapsulant to all surfaces in the Work Area that were not the subject of removal. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results.
- E. After the encapsulant has dried, the first layer of polyethylene sheeting shall then be removed and bagged, and the Work Area shall be vacated for a minimum of 12 hours.

44.3 SECOND CLEANING

- A. All surfaces in the Work Area shall be HEPA vacuumed and/or wet cleaned.
- B. The Asbestos Project Monitor shall conduct a second visual inspection of the Work Area for cleanliness.
- C. The second layer of polyethylene sheeting shall be removed and bagged and the Work Area shall be vacated for a minimum of 12 hours.

44.4 THIRD CLEANING

- A. All surfaces in the Work Area shall be HEPA vacuumed and/or wet cleaned.
- B. The Asbestos Project Monitor shall conduct a third visual inspection of the Work Area for cleanliness.
- C. The Work Area shall be vacated for a minimum of 12 hours regardless of the cleaning method (HEPA vacuuming or wet cleaning) utilized.
- D. Aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
- E. Upon receipt of satisfactory final clearance air sampling results, the negative air pressure equipment can then be shut down and decontamination areas and isolation and critical barriers removed.

1)

- 44.5 AFTER ISOLATION AND CRITICAL BARRIERS ARE REMOVED, THE ASBESTOS PROJECT MONITOR SHALL INSPECT THE WORK AREA FOR CLEANLINESS. IF NECESSARY, ADDITIONAL CLEANING SHALL BE PERFORMED BY THE CONTRACTOR AS DIRECTED BY THE ASBESTOS PROJECT MONITOR.**
- 44.6 AS A RESULT OF ANY VISUAL INSPECTION BY THE ASBESTOS PROJECT MONITOR OR SHOULD AIR SAMPLING RESULTS INDICATE HIGH FIBER LEVELS; THE CONTRACTOR WILL CLEAN OR RE-CLEAN THE AFFECTED AREAS AT NO ADDITIONAL EXPENSE TO THE OWNER.**

TENT ENCLOSURES

- 45.1 TENT ENCLOSURES MAY ONLY BE USED IN AREAS SPECIFICALLY PERMITTED BY NYS DEPARTMENT OF LABOR CODE RULE 56 OR A PROJECT SPECIFIC VARIANCE ISSUED BY THE NYS DEPARTMENT OF LABOR.**
- 45.2 THE CONTRACTOR SHALL RESTRICT ACCESS TO THE IMMEDIATE AREA WHERE TENT REMOVAL PROCEDURES ARE TAKING PLACE USING BARRIER TAPE AND/OR CONSTRUCTION BARRIERS. CAUTION SIGNS SHALL BE POSTED.**
- 45.3 REMOTE PERSONNEL AND WASTE DECONTAMINATION ENCLOSURES SHALL BE CONSTRUCTED. CONFIGURATION SHALL BE AS REQUIRED BY PROJECT SIZE.**
- 45.4 THE WORK AREA SHALL BE PRE-CLEANED. ALL OBJECTS AND EQUIPMENT THAT WILL REMAIN IN THE RESTRICTED AREA DURING ABATEMENT SHALL BE SEALED WITH TWO LAYERS OF SIX MIL POLYETHYLENE AND TAPE.**
- 45.5 THE TENT SHALL BE A SINGLE USE BARRIER CONSTRUCTED WITH A RIGID FRAME AND AT LEAST TWO LAYERS OF SIX MIL POLYETHYLENE UNLESS ONE LAYER OF SIX MIL POLYETHYLENE IS OTHERWISE PERMITTED BY A SITE SPECIFIC VARIANCE. ALL SEAMS SHALL BE SEALED AIRTIGHT USING DUCT TAPE AND/OR SPRAY ADHESIVE.**
- 45.6 THE TENT SHALL BE CONSTRUCTED WITH AT LEAST ONE AIRLOCK FOR WORKER/WASTE EGRESS.**
- 45.7 DURING REMOVALS, A HEPA VACUUM OR SMALL CAPACITY NEGATIVE PRESSURE FILTRATION UNIT SHALL BE USED TO PROVIDE A NEGATIVE AIR PRESSURE INSIDE THE TENT.**
- 45.8 WORKERS SHALL WEAR TWO DISPOSABLE SUITS FOR ALL PHASES OF WORK. WORKERS EXITING THE TENT SHALL HEPA VACUUM THE OUTER SUIT, ENTER THE AIRLOCK, REMOVE THE OUTER SUIT AND THEN PLACE IT BACK INTO THE WORK AREA. A CLEAN SECOND SUIT SHALL BE DONNED BEFORE EXITING THE AIRLOCK AND PROCEEDING TO THE DECONTAMINATION ENCLOSURE OR ANOTHER WORK AREA.**
- 45.9 OSHA COMPLIANCE AIR MONITORING IS REQUIRED PER SECTION 1.09.**
- 45.10 ACM REMOVAL SHALL FOLLOW PROCEDURES DEFINED IN SECTION 3.07.**
- 45.11 WASTE MATERIAL SHALL BE PLACED IN PROPERLY LABELED 6 MIL PLASTIC BAGS OR OTHER APPROPRIATE CONTAINERS. THE OUTSIDE OF THE BAGS OR CONTAINERS SHALL BE WET WIPED AND/OR HEPA VACUUMED BEFORE BEING PASSED INTO THE AIRLOCK FOR DOUBLE- BAGGING. THE BAGS OR CONTAINERS SHALL THEN BE TRANSPORTED TO THE DECONTAMINATION ENCLOSURE AND THEN BAGGED FOR A THIRD TIME AND TRANSPORTED TO THE WASTE STORAGE CONTAINER. ALL TRANSPORTATION OF WASTE BAGS AND CONTAINERS OUTSIDE THE WORK AREA SHALL BE IN WATERTIGHT CARTS.**

45.12 FOLLOWING COMPLETION OF GROSS ABATEMENT AND AFTER ALL ACCUMULATIONS OF ASBESTOS WASTE MATERIALS HAVE BEEN CONTAINERIZED, THE FOLLOWING DECONTAMINATION PROCEDURES SHALL BE FOLLOWED.

- A. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
- B. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
- C. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
- D. The Contractor shall then apply a thin coat of encapsulant to all surfaces in the Work Area that were not the subject of removal. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results.
- E. After the encapsulant has dried, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
- F. Upon receipt of satisfactory final clearance air sampling results, the tent shall be collapsed into itself, placed in suitable disposal bags, and transported to the waste decontamination enclosure. Isolation and critical barriers shall then be removed.

GLOVEBAG REMOVAL

46.1 GLOVEBAG REMOVALS MAY ONLY BE USED AS SPECIFICALLY PERMITTED BY NYS DEPARTMENT OF LABOR CODE RULE 56 OR A PROJECT SPECIFIC VARIANCE ISSUED BY THE NYS DEPARTMENT OF LABOR. GLOVEBAGS MAY ONLY BE USED ON PIPING.

46.2 IN ADDITION TO CONFORMANCE WITH APPLICABLE REGULATIONS AND VARIANCES, GLOVEBAG REMOVALS ARE ONLY PERMITTED TO BE CONDUCTED WITHIN TENT ENCLOSURES COMPLYING WITH THESE SPECIFICATIONS. REMOVAL AND DISPOSALS MUST ALSO BE CONDUCTED IN CONFORMANCE WITH ALL PROJECT VARIANCE CONDITIONS.

46.3 THE CONTRACTOR SHALL RESTRICT ACCESS TO THE IMMEDIATE AREA WHERE TENT/GLOVEBAG REMOVAL PROCEDURES ARE TAKING PLACE USING BARRIER TAPE AND/OR CONSTRUCTION BARRIERS. CAUTION SIGNS SHALL BE POSTED.

46.4 REMOTE PERSONNEL AND WASTE DECONTAMINATION ENCLOSURES SHALL BE CONSTRUCTED. CONFIGURATION SHALL BE AS REQUIRED BY PROJECT SIZE.

46.5 THE WORK AREA SHALL BE PRE-CLEANED. ALL OBJECTS AND EQUIPMENT WHICH WILL REMAIN IN THE RESTRICTED AREA DURING ABATEMENT SHALL BE SEALED WITH TWO LAYERS OF SIX MIL POLYETHYLENE AND TAPE.

46.6 GLOVEBAG REMOVALS SHALL UTILIZE COMMERCIALY AVAILABLE GLOVEBAGS OF AT LEAST SIX MIL THICKNESS. USE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THE FOLLOWING MINIMUM REQUIREMENTS:

- A. The sides of the glovebag shall be cut to fit the size pipe being removed. Tools shall be inserted into the attached tool pocket.
- B. The glovebag shall be placed around the pipe and the open edges shall be folded and sealed with staples and duct tape. The glovebag shall also be sealed at the pipe to form a tight seal.

- C. Openings shall be made in the glovebag for the wetting tube and HEPA vacuum hose. The opening shall be sealed to form a tight seal.
- D. All glovebags shall be smoke tested by the Asbestos Project Monitor before removal operations commence. Glovebags that do not pass the smoke test shall be resealed and then retested.
- E. After first wetting the materials to be removed, removal may commence ACM shall be continuously wetted. After removal of the ACM, the piping shall be scrubbed or brushed so that no visible ACM remains. Open ends of pipe insulation shall be encapsulated.
- F. After the piping is cleaned, the inside of the glovebag shall be washed down and the wetting tube removed. Using the HEPA vacuum, the glovebag shall be collapsed and then twisted and sealed with tape with the ACM at the bottom of the bag.
- G. A disposal bag shall be placed around the glovebag that is then detached from the pipe. The disposal bag is then sealed and transported to the decontamination enclosure.

46.7 AFTER GLOVEBAG REMOVALS ARE COMPLETE, TENT DECONTAMINATION PROCEDURES SHALL BE FOLLOWED.

DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

47.1 RESILIENT FLOOR COVERINGS: REMOVE FLOOR COVERINGS AND ADHESIVE ACCORDING TO REGULATORY REQUIREMENTS AND RECOMMENDATIONS IN RFCI-WP AND ITS ADDENDUM.

47.2 CONTRACTOR OPTION: USE ONE OF THE TWO REMOVAL METHODS BELOW.

- A. Under Abatement Controls Remove Residual Adhesive with solvents.
- B. After Air Clearance is achieved Scour entire area using process to removal traces of solvent. Process to include the following process and products.
 - 1. Additional Adhesive remover: Remove adhesive according to manufacturer's instructions using Mapei Planiprep AR Adhesive Remover.
 - 2. Concrete Scouring: Scour concrete according to manufacturer's instructions using Mapei Planiprep SA Concrete Scouring Agent
 - 3. Subfloor Treatment: Apply. according to manufacturer's instructions using Mapei Planiprep ET Epoxy Concert Subfloor treatment
 - 4.
- C. Remove residual adhesive by mechanical means (bead blast) and prepare substrate for new floor coverings by one of the methods recommended by RFCI and in accordance with Regulatory Requirements.
 - 1. No Solvent based mastic strippers are to be used.

ROOF REMOVALS

- 48.1 ROOFING: REMOVE NO MORE EXISTING ROOFING THAN CAN BE COVERED IN ONE DAY BY NEW ROOFING AND SO THAT BUILDING INTERIOR REMAINS WATERTIGHT AND WEATHERTIGHT. REFER TO DIVISION 07 SECTIONS FOR NEW ROOFING REQUIREMENTS.**
- 48.2 EXCEPT AS MODIFIED BY THIS SECTION, REMOVAL OF BUILT UP ROOFING, ROOF FLASHINGS AND FLASHING CEMENT SHALL CONFORM TO ALL PROVISIONS OF THIS SPECIFICATION.**
- 48.3 UNLESS PROJECT SPECIFIC VARIANCES HAVE BEEN OTHERWISE OBTAINED, ROOFING REMOVALS SHALL BE CONDUCTED IN ACCORDANCE WITH THE PROVISIONS OF NYS DOL ICR-56.**
- 48.4 THE WORK AREA SHALL BE THE ROOF AREA FROM WHICH ACM MATERIALS ARE BEING REMOVED AND SHALL EXTEND 25 FEET FROM THE PERIMETER OF THE REMOVAL AREA.**
- 48.5 NON-CERTIFIED WORKERS ARE NOT ALLOWED IN THE WORK AREA UNTIL THE WORK AREA IS CLEARED BY THE ASBESTOS PROJECT MONITOR.**
- 48.6 REMOTE PERSONNEL AND WASTE DECONTAMINATION ENCLOSURES SHALL BE CONSTRUCTED AT A LOCATION IN ACCORDANCE WITH THE APPROVED WORK PLAN. UNLESS LOCATED OUTSIDE THE WORK AREA, DECONTAMINATION ENCLOSURES ARE NOT PERMITTED TO BE CONSTRUCTED ON THE ROOF. DECONTAMINATION ENCLOSURES SHALL BE STATIONARY AND LOCATED WITHIN 50 FEET OF THE BUILDING.**
- 48.7 ALL OPENINGS (INCLUDING BUT NOT LIMITED TO WINDOWS, DOORS, HATCHES, VENTS, DUCTS, AND GRILLES) ON THE ROOF LEVEL AND THE FLOOR BELOW SHALL BE SEALED WITH TWO LAYERS OF SIX MIL POLYETHYLENE. ALTERNATELY, A POLYETHYLENE DRAPE MAY BE USED INSTEAD OF SEALING WINDOWS INDIVIDUALLY.**
- 48.8 THE REMOVAL OF THE ACM MAY REQUIRE THE USE OF SCRAPERS, SOLVENTS, MASTIC REMOVAL CHEMICALS, OR OTHER METHODS/PROCEDURES TO ENSURE COMPLETE REMOVAL.**
- 48.9 THE CONTRACTOR IS REQUIRED TO PROVIDE TEMPORARY PROTECTION OF THE ROOF AT THE END OF EACH WORK SHIFT SO AS TO MAINTAIN THE ROOF IN A WATERTIGHT CONDITION.**
- 48.10 DUMPSTERS USED FOR WASTE STORAGE SHALL BE LINED WITH TWO LAYERS OF SIX MIL POLYETHYLENE AND SHALL HAVE A HARD TOP. WHERE OPEN-TOP DUMPSTERS ARE PERMITTED, THE TOP SHALL BE CLOSED WITH POLYETHYLENE FLAPS THAT ARE SEALED AT THE END OF EACH WORK SHIFT.**
- 48.11 PERSONAL PROTECTIVE EQUIPMENT, INCLUDING RESPIRATORS, SHALL BE UTILIZED AND WORN DURING ALL REMOVAL OPERATIONS UNTIL THE WORK AREA IS CLEARED BY THE ASBESTOS PROJECT MONITOR.**
- 48.12 THE OWNER MAY, AT HIS DISCRETION, CHOOSE TO CONDUCT AIR SAMPLING. IF AIR SAMPLES COLLECTED DURING ABATEMENT INDICATE ANY AIRBORNE ASBESTOS FIBER CONCENTRATION(S) AT OR ABOVE 0.01 F/CC, WORK SHALL BE STOPPED IMMEDIATELY AND WORK METHODS SHALL BE ALTERED TO REDUCE THE AIRBORNE ASBESTOS FIBER CONCENTRATION(S).**

RESTORATION OF UTILITIES, FIRESTOPPING, AND FINISHES

49.1 AFTER FINAL CLEARANCE REMOVE LOCKS AND RESTORE ELECTRICAL AND HVAC SYSTEMS. ALL TEMPORARY POWER SHALL BE DISCONNECTED, POWER LOCKOUTS REMOVED AND POWER RESTORED. ALL TEMPORARY PLUMBING SHALL BE REMOVED.

49.2 FINISHES DAMAGED BY ASBESTOS ABATEMENT ACTIVITIES INCLUDING, BUT NOT LIMITED TO, PLASTER/PAINT DAMAGE DUE TO DUCT TAPE AND SPRAY ADHESIVES, AND FLOOR TILE LIFTED DUE TO WET OR HUMID CONDITIONS, SHALL BE RESTORED PRIOR TO FINAL PAYMENT.

- A. Finishes unable to be restored shall be replaced under this Contract.
- B. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.

1)

49.3 ALL PENETRATIONS (INCLUDING, BUT NOT LIMITED TO, PIPES, DUCTS, ETC.) THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRESTOPPED USING MATERIALS AND SYSTEMS TESTED IN ACCORDANCE WITH ASTM E814 ON PROJECTS WHERE REINSULATION IS PART OF THE REQUIRED WORK.

PART 1 DISPOSAL OF ASBESTOS WASTE

APPLICABLE REGULATIONS

51.1 ALL ASBESTOS WASTE SHALL BE STORED, TRANSPORTED AND DISPOSED OF IN ACCORDANCE WITH THE FOLLOWING REGULATIONS AS A MINIMUM:

- A. NYS DEC 6 NYRCC part 360 and 364
- B. US EPA NESHAPS 40 CFR 61
- C. US EPA Asbestos Waste Management Guidance EPA/530-SW85
- D. NYC Local Law 70/85 (for Projects located in New York City).

TRANSPORTATION AND DISPOSAL SITE

- 52.1 THE CONTRACTOR'S HAULER AND DISPOSAL SITE SHALL BE APPROVED BY THE OWNER.**
- 52.2 THE CONTRACTOR SHALL GIVE TWENTY-FOUR (24) HOUR NOTIFICATION PRIOR TO REMOVING ANY WASTE FROM THE SITE. WASTE SHALL BE REMOVED FROM THE SITE ONLY DURING NORMAL WORKING HOURS UNLESS OTHERWISE SPECIFIED. NO WASTE MAY BE TAKEN FROM THE SITE UNLESS THE CONTRACTOR AND ENVIRONMENTAL CONSULTANT ARE PRESENT AND THE ENVIRONMENTAL CONSULTANT AUTHORIZES THE RELEASE OF THE WASTE AS DESCRIBED HEREIN.**
- 52.3 THE CONTRACTOR SHALL HAVE THE HAULER PROVIDE THE ESTIMATED DATE AND TIME OF ARRIVAL AT THE DISPOSAL SITE.**
- 52.4 UPON ARRIVAL AT THE PROJECT SITE, THE HAULER MUST POSSESS AND PRESENT TO THE ENVIRONMENTAL CONSULTANT A VALID NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PART 364 ASBESTOS HAULER'S PERMIT. THE ENVIRONMENTAL CONSULTANT MAY VERIFY THE AUTHENTICITY OF THE HAULER'S PERMIT WITH THE PROPER AUTHORITY.**
- 52.5 THE HAULER, WITH THE CONTRACTOR AND THE ENVIRONMENTAL CONSULTANT, SHALL INSPECT ALL MATERIAL IN THE TRANSPORT CONTAINER PRIOR TO TAKING POSSESSION AND SIGNING THE ASBESTOS WASTE MANIFESTS.**
- 52.6 UNLESS SPECIFICALLY APPROVED BY THE OWNER, THE CONTRACTOR SHALL NOT PERMIT ANY OFF-SITE TRANSFERS OF THE WASTE OR ALLOW THE WASTE TO BE TRANSPORTED OR COMBINED WITH ANY OTHER OFF-SITE ASBESTOS MATERIAL. THE HAULER MUST TRAVEL DIRECTLY TO THE DISPOSAL SITE AS IDENTIFIED ON THE NOTIFICATIONS WITH NO UNAUTHORIZED STOPS.**

WASTE STORAGE CONTAINERS

- 53.1 ALL WASTE CONTAINERS SHALL BE FULLY ENCLOSED AND LOCKABLE (I.E. ENCLOSED DUMPSTER, TRAILER, ETC.). NO OPEN CONTAINERS WILL BE PERMITTED ON-SITE (I.E. OPEN DUMPSTER WITH CANVAS COVER, ETC.) UNLESS SPECIFICALLY PERMITTED BY AN APPLICABLE OR SITE SPECIFIC VARIANCE.**
- 53.2 THE ENVIRONMENTAL CONSULTANT SHALL VERIFY THAT THE WASTE STORAGE CONTAINER AND/OR TRUCK TAGS (LICENSE PLATES) MATCH THAT LISTED ON THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PART 364 PERMIT. ANY CONTAINER NOT LISTED ON THE PERMIT SHALL BE REMOVED FROM THE SITE IMMEDIATELY.**
- 53.3 THE CONTAINER SHALL BE PLASTICIZED AND SEALED WITH A MINIMUM OF ONE (1) LAYER OF 6 MIL POLYETHYLENE ON THE SIDES AND TWO (2) LAYERS OF 6 MIL POLYETHYLENE ON THE FLOOR. ONCE ON SITE, IT SHALL BE KEPT LOCKED AT ALL TIMES, EXCEPT DURING LOAD OUT. THE WASTE CONTAINER SHALL NOT BE USED FOR STORAGE OF EQUIPMENT OR CONTRACTOR SUPPLIES.**
- 53.4 WHILE ON-SITE, THE CONTAINER SHALL BE LABELED WITH EPA DANGER SIGNAGE:**
- 1) DANGER**
 - 2) CONTAINS ASBESTOS FIBERS**
 - 3) AVOID CREATING DUST**
 - 4) CANCER AND LUNG DISEASE HAZARD**

5)

53.5 THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION ASBESTOS HAULER'S PERMIT NUMBER SHALL BE STENCILED ON BOTH SIDES AND BACK OF THE CONTAINER.

53.6 THE CONTAINER IS NOT PERMITTED TO BE LOADED UNLESS IT IS PROPERLY PLASTICIZED, HAS THE APPROPRIATE DANGER SIGNAGE AFFIXED, AND HAS THE PERMIT NUMBER APPROPRIATELY STENCILED ON THE CONTAINER.

53.7 IF A LINED AND SEALED OPEN-TOP CONTAINER IS USED PURSUANT TO A SITE SPECIFIC VARIANCE, A SEAL IS NOT REQUIRED.

53.8 THE OWNER MAY INITIATE RANDOM CHECKS AT THE DISPOSAL SITE TO INSURE THAT THE PROCEDURES OUTLINED HEREIN ARE COMPLIED WITH.

OWNER'S AND HAULER'S ASBESTOS WASTE MANIFESTS

54.1 AN ASBESTOS WASTE MANIFEST SHALL BE UTILIZED IN CONJUNCTION WITH THE ASBESTOS HAULER'S MANIFEST.

54.2 THE HAULER'S MANIFEST SHALL BE COMPLETED BY THE CONTRACTOR AND VERIFIED BY THE ENVIRONMENTAL CONSULTANT THAT ALL THE INFORMATION AND AMOUNTS ARE ACCURATE AND THE PROPER SIGNATURES ARE IN PLACE.

54.3 THE MANIFESTS SHALL HAVE THE APPROPRIATE SIGNATURES OF THE ENVIRONMENTAL CONSULTANT, THE CONTRACTOR, AND THE HAULER REPRESENTATIVES PRIOR TO ANY WASTE BEING REMOVED FROM THE SITE.

54.4 COPIES OF THE COMPLETED HAULER'S MANIFEST SHALL BE RETAINED BY THE ENVIRONMENTAL CONSULTANT AND THE CONTRACTOR AND SHALL REMAIN ON SITE FOR INSPECTION.

54.5 UPON ARRIVAL AT THE DISPOSAL SITE, THE HAULER'S MANIFEST SHALL BE SIGNED BY THE DISPOSAL FACILITY OPERATOR TO CERTIFY RECEIPT OF ACM COVERED BY THE MANIFEST.

54.6 THE DISPOSAL FACILITY OPERATOR SHALL RETURN THE ORIGINAL HAULER'S MANIFEST AND THE CONTAINER SEALS TO THE CONTRACTOR.

54.7 THE CONTRACTOR SHALL FORWARD COPIES OF THE HAULER'S MANIFEST AND THE CONTAINER SEALS TO THE ENVIRONMENTAL CONSULTANT WITHIN 14 DAYS OF THE WASTE CONTAINER BEING REMOVED FROM THE SITE. FAILURE TO DO SO MAY RESULT IN PAYMENT BEING WITHHELD FROM THE CONTRACTOR.

54.8 THE CONTRACTOR SHALL UTILIZE A WASTE DISPOSAL LOG. THIS LOG SHALL BE MAINTAINED BY THE PROJECT SUPERVISOR AND SHALL BE KEPT ON SITE AT ALL TIMES.

54.9 ORIGINALS OF ALL WASTE DISPOSAL MANIFESTS, SEALS, AND DISPOSAL LOGS SHALL BE SUBMITTED BY THE CONTRACTOR TO THE OWNER WITH THE FINAL CLOSE-OUT DOCUMENTATION.

54.10 CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF DUST, DIRT, AND DEBRIS CAUSED BY ACM DEMOLITION OPERATIONS IN ACCORDANCE WITH REGULATORY REQUIREMENTS. RETURN ADJACENT AREAS TO CONDITION EXISTING BEFORE ACM DEMOLITION OPERATIONS BEGAN.

(a) END OF SECTION 028213

END OF SECTION

This page intentionally left blank

**SECTION 035400
CAST UNDERLAYMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Liquid-applied self-leveling floor underlayment.
 - 1. Use gypsum-based type.

1.02 REFERENCE STANDARDS

- A. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete 2020.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.
- C. Manufacturer's Instructions.

1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F (41 degrees C).

1.06 FIELD CONDITIONS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Maintain minimum ambient temperatures of 50 degrees F (10 degrees C) 24 hours before, during and 72 hours after installation of underlayment.
- C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gypsum Underlayment:
 - 1. ARDEX Engineered Cements; ARDEX K 22 F with ARDEX P51 Primer:
www.ardexamericas.com/#sle.
 - 2. CMP Specialty Products, LP1.

2.02 MATERIALS

- A. Cast Underlayments, General:
- B. Gypsum-Based Underlayment: Gypsum based mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
 - 1. Compressive Strength: Minimum 2500 pounds per square inch (17.24 MPa), tested per ASTM C472.
 - 2. Density: Maximum [] pounds per cubic foot ([] kg/cu m).
 - 3. Final Set Time: 1 to 2 hours, maximum.
 - 4. Thickness: [1/4] inch ([] mm) to maximum 3-1/2 inch (89 mm).

5. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.
- C. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch (3 mm) in size and acceptable to underlayment manufacturer.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.
- E. Primer: Manufacturer's recommended type.
- F. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

2.03 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Add aggregate for areas where thickness will exceed 1/2 inch (12.7 mm). Mix underlayment and water for at least two minutes before adding aggregate, and continue mixing to assure that aggregate has been thoroughly coated.
- C. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.02 PREPARATION

- A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.
- B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- C. Vacuum clean surfaces.
- D. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- E. Close floor openings.

3.03 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft (1:1000).
- C. For final thickness over 1-1/2 inches (38 mm), place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin application of the subsequent layer within 24 hours.
- D. Place before partition installation.
- E. Where additional aggregate has been used in the mix, add a top layer of neat mix (without aggregate), if needed to level and smooth the surface.
- F. If a fine, feathered edge is desired, steel trowel the edge after initial set, but before it is completely hard.

3.04 CURING

- A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.
- B. Air cure in accordance with manufacturer's instructions.

3.05 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field inspection and testing, as specified in Section 014000 - Quality Requirements.
- B. Placed Material: Agency will inspect and test for compliance with specification requirements.

3.06 PROTECTION

- A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.
- B. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION

**SECTION 055000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 099123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2020.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- K. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.
- L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- N. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- O. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- P. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- Q. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- R. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.
- S. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating 2011 (Reapproved 2021).

- T. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- U. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- V. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- W. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2021.
- X. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- Y. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2021).
- Z. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata 2020.
- AA. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- BB. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- CC. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Stainless Steel, General: ASTM A666, Type 304.
- F. Stainless Steel Tubing: ASTM A554, Type 304, 16 gauge, 0.0625 inch (1.59 mm) minimum metal thickness, 1-1/2 inch (38 mm) diameter.
- G. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- H. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- I. Stainless Steel Finish: No. 4 Bright Polished finish.
- J. Slotted Channel Fittings: ASTM A1011/A1011M.
- K. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- L. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- M. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- N. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- O. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

- P. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum-Alloy Die Castings: ASTM B85/B85M.
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Channels and Plates Not Attached to Structural Framing: ; prime paint finish.
- B. Lintels: As detailed; prime paint finish.
- C. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

2.05 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for exterior finish.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating. (Provide minimum 530 g/sq m galvanized coating.)
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.06 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I natural anodized where indicated on Drawings.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

2.07 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

**SECTION 061063
MISCELLANEOUS ROUGH CARPENTRY****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Roofing cant strips.
- D. Preservative treated wood materials.
- E. Fire retardant treated wood materials.
- F. Communications and electrical room mounting boards.
- G. Concealed wood blocking, nailers, and supports.
- H. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 077200 - Roof Accessories: Prefabricated roof curbs.
- B. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- D. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- E. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2019a.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- G. AWPA U1 - Use Category System: User Specification for Treated Wood 2021.
- H. PS 1 - Structural Plywood 2009 (Revised 2019).
- I. PS 20 - American Softwood Lumber Standard 2020.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a -year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - 3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No.2 or Standard Grade.
 - 2. Boards: Standard or No.3.

2.03 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Other Applications:
 - 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
 - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
 - 3. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
 - 1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
- C. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

- B. Fire Retardant Treatment:
1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat exterior rough carpentry items.
 - c. Do not use treated wood in direct contact with ground.
 2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature, low hygroscopic type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Interior rough carpentry items are to be fire retardant treated.
 - c. Treat rough carpentry items as indicated.
 - d. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber exposed to weather.
 - c. Treat lumber in contact with roofing, flashing, or waterproofing.
 - d. Treat lumber in contact with masonry or concrete.
 - e. Treat lumber less than 18 inches (450 mm) above grade.
 - f. Treat lumber in other locations as indicated.
 2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches (450 mm) above grade.
 - e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size and Location: As indicated on drawings.

3.06 CLEANING

- A. Waste Disposal: See Section 017419 - Construction Waste Management and Disposal.
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

**SECTION 078400
FIRESTOPPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

- A. Section 017000 - Execution and Closeout Requirements: Cutting and patching.
- B. Section 092116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems 2020a.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2020a.
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2020.
- G. ITS (DIR) - Directory of Listed Products current edition.
- H. FM (AG) - FM Approval Guide current edition.
- I. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).
- J. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
- K. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
- L. UL (DIR) - Online Certifications Directory Current Edition.
- M. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's qualification statement.

1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
 - 2. A/D Fire Protection Systems Inc: www.adfire.com/#sle.
 - 3. Hilti, Inc: www.us.hilti.com/#sle.
 - 4. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: www.tremcosealants.com/#sle.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
- B. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - 1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.04 FIRESTOPPING FOR PERIMETER CONTAINMENT

- A. Perimeter Joint Systems That Have Not Been Tested For Movement Capabilities (Static-S):
 - 1. 2 Hour Construction: UL System CW-S-0002; Specified Technologies Inc. AS200 Elastomeric Spray.
 - 2. 2 Hour Construction: UL System CW-S-0002; Specified Technologies Inc. Fast Tack Firestop Spray.
 - 3. 2 Hour Construction: UL System CW-S-0003; Specified Technologies Inc. Fast Tack Firestop Spray.
 - 4. 2 Hour Construction: UL System CW-S-0007; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.

2.05 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

- A. Concrete and Concrete Masonry Walls and Floors:
 - 1. Floor-to-Floor Joints:
 - a. 2 Hour Construction: UL System FF-D-1013; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System FF-D-1085; Tremco, TREMstop Acrylic Firestop Sealant.

2. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
 - a. 2 Hour Construction: UL System HW-D-0039; Specified Technologies Inc. ES Elastomeric Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0181; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - c. 2 Hour Construction: UL System HW-D-1037; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 3. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Floor:
 - a. 2 Hour Construction: UL System HW-D-0268; Hilti CP 606 Flexible Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0312; Specified Technologies Inc. SIL Silicone Sealant.
 4. Concrete/Concrete Masonry Wall-to-Wall Joint Systems That Have Not Been Tested For Movement Capabilities (Static-S):
- B. Gypsum Board Walls:
1. Wall-to-Wall Joints That Have Not Been Tested For Movement Capabilities (Static-S):
 - a. 2 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - b. 1 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 2. Head-of-Wall Joints at Underside of Steel Beam and Concrete Over Metal Deck Floor with Sprayed On Fireproofing:
 - a. 2 Hour Construction: UL System HW-D-0252; Specified Technologies Inc. AS200 Elastomeric Spray.
 - b. 2 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - c. 1 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 3. Head-of-Wall Joints at Underside of Flat Concrete:
 - a. 2 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System HW-D-0757; Hilti CFS-TTS Top Track Seal.
 - c. 2 Hour Construction: UL System HW-D-0016; Tremco, TREMstop Acrylic Firestop Sealant.
 - d. 2 Hour Construction: UL System HW-D-0017; Tremco, TREMstop Acrylic Firestop Sealant.
 - e. 2 Hour Construction: UL System HW-D-1072; Tremco, TREMstop Acrylic Firestop Sealant.
 - f. 1 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - g. 1 Hour Construction: UL System HW-D-0757; Hilti CFS-TTS Top Track Seal.
 - h. 1 Hour Construction: UL System HW-D-0016; Tremco, TREMstop Acrylic Firestop Sealant.
 4. Head-of-Wall Joints at Concrete Over Metal Deck:
 - a. 2 Hour Construction: UL System HW-D-0256; Tremco, TREMstop Acrylic Firestop Sealant.
 - b. 1 Hour Construction: UL System HW-D-0256; Tremco, TREMstop Acrylic Firestop Sealant.
 5. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
 - a. 2 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.
 - c. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - d. 1 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.

6. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Cut to Fit Ribs:
 - a. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
 - b. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
7. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Not Cut to Fit:
 - a. 2 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
 - c. 1 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - d. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.

2.06 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

- A. Blank Openings:
 1. In Floors or Walls:
 - a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- B. Penetrations Through Floors or Walls By:
 1. Multiple Penetrations in Large Openings:
 - a. 3 Hour Construction: UL System C-AJ-8099; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 3 Hour Construction: UL System C-AJ-8110; Hilti CFS-BL Firestop Block.
 - c. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-1090; Specified Technologies Inc. SSP Firestop Putty.
 - b. 2 Hour Construction: UL System C-AJ-1198; Specified Technologies Inc. SIL Silicone Sealant.
 - c. 2 Hour Construction: UL System C-AJ-1226; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 2 Hour Construction: UL System C-AJ-1240; Specified Technologies Inc. LC Endothermic Firestop Sealant.
 - e. 2 Hour Construction: UL System C-AJ-1425; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-2167; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
 - c. 2 Hour Construction: UL System C-BJ-2021; Hilti CP 643N Firestop Collar.
 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
 - b. 2 Hour Construction: UL System C-AJ-3283; Hilti CFS-SL SK Firestop Sleeve Kit.
 - c. 2 Hour Construction: UL System C-AJ-3283; Hilti CFS-SL SK Firestop Sleeve Kit with Hilti CFS-SL GP Gangplate.
 - d. 2 Hour Construction: UL System W-J-3198; Hilti CFS-SL RK Retrofit Sleeve Kit for Existing Cables.
 - e. 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
 5. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System C-AJ-4094; Hilti CFS-BL Firestop Block.
 6. Electrical Busways:
 - a. 3 Hour Construction: UL System C-AJ-6017; Hilti FS-ONE MAX Intumescent Firestop Sealant.

7. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 604 Self-Leveling Firestop Sealant or CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
 - b. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE IMAX Intumescent Firestop Sealant.
8. HVAC Ducts, Uninsulated:
 - a. 3 Hour Construction: UL System C-AJ-7051; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- C. Penetrations Through Floors By:
 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System F-A-8012; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade or CFS-S SIL SL Firestop Silicone Sealant Self-Leveling.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-1110; Specified Technologies Inc. CID Cast-In Device.
 - c. 2 Hour Construction: UL System F-A-1129; Specified Technologies Inc. Closet Flange Firestop Gasket.
 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-2065; Hilti CP 680-P Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-2213; Hilti CFS-DID Drop-In Device.
 - c. 2 Hour Construction: UL System F-A-2053; Hilti CP 680-P Cast-In Device.
 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System F-A-3033; Hilti CP 680-P/M Cast-In Device.
 5. Electrical Busways:
 - a. 2 Hour Construction: UL System F-A-6002; Hilti CP 604 Self-Leveling Firestop Sealant.
 6. Insulated Pipes:
 - a. 2 Hour Construction: UL System F-A-5015; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-5017; Hilti CP 680-P/M Cast-In Device.
- D. Penetrations Through Walls By:
 1. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3095; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System C-AJ-5090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 1 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 4. HVAC Ducts, Uninsulated:

- a. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE MAX Intumescent Firestop Sealant, or CP 606 Flexible Firestop Sealant.
- 5. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.07 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 - 1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - 2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-8013; Hilti CFS-BL Firestop Block.
 - c. 2 Hour Construction: UL System W-L-8071; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - e. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - f. 1 Hour Construction: UL System W-L-8013; Hilti CFS-BL Firestop Block.
 - g. 1 Hour Construction: UL System W-L-8071; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - h. 1 Hour Construction: UL System W-L-8073; Specified Technologies Inc. Composite Sheet.
 - i. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 2 Hour Construction: UL System W-L-1506; Hilti CFS-D Firestop Cable Disc.
 - d. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - e. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - f. 1 Hour Construction: UL System W-L-1506; Hilti CFS-D Firestop Cable Disc.
 - 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - b. 2 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - d. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
 - b. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - c. 2 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for Existing Cables.
 - d. 2 Hour Construction: UL System W-L-3395; Hilti CFS-SL SK Firestop Sleeve Kit with Hilti CFS-SL GP Gangplate.

- e. 2 Hour Construction: UL System W-L-3414; Hilti CFS-D Firestop Cable Disc.
- f. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
- g. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- h. 1 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for Existing Cables.
- i. 1 Hour Construction: UL System W-L-3414; Hilti CFS-D Firestop Cable Disc.
- 5. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
 - b. 2 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
 - d. 1 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- 6. Insulated Pipes:
 - a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 1 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
- 7. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.08 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

**SECTION 079200
JOINT SEALANTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 072500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
- B. Section 078400 - Firestopping: Firestopping sealants.
- C. Section 088000 - Glazing: Glazing sealants and accessories.
- D. Section 092116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- E. Section 092216 - Non-Structural Metal Framing : Sealing between framing and adjacent construction in acoustical and sound-rated walls and ceilings.
- F. Section 233100 - HVAC Ducts and Casings: Duct sealants.

1.03 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015 (Reapproved 2022).
- B. ASTM C834 - Standard Specification for Latex Sealants 2017.
- C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2022.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.
- G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 8. Sample product warranty.
 - 9. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a one year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - 2. Hilti, Inc: www.us.hilti.com/#sle.
 - 3. Pecora Corporation: www.pecora.com/#sle.
 - 4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 5. Sika Corporation: www.usa-sika.com/#sle.
 - 6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
 - 7. Equivalents: As approved by Architect.
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
 - 1. Pecora Corporation: www.pecora.com/#sle.
 - 2. Sika Corporation: www.usa-sika.com/#sle.
 - 3. Equivalents: As approved by Architect.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 - f. Joints indicated on Drawings.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
 - 1) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
 - c. Other joints indicated below.
 - 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.

- c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
- d. Joints where installation of sealant is specified in another section.
- e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
- C. Interior Joints: Use non-sag silicone sealant, unless otherwise indicated.
 - 1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
 - 2. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 - 3. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- D. Interior Wet Areas: restrooms and food service areas; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".
- F. Exterior Horizontal Joints: Use self-leveling, non-staining, silicone sealant, unless otherwise noted.

2.03 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 016116.
- B. Colors: Architect to select from manufacturer's standard range..

2.04 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
- B.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Non-Staining To Porous Stone: Non-staining to light-colored masonry when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
 - 5. Color: To be selected by Architect from manufacturer's standard range.
 - 6. Service Temperature Range: Minus 20 to 180 degrees F (Minus 29 to 82 degrees C).
 - 7. Manufacturers:
 - a. Dow Chemical Company; DOWSIL 756 SMS Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - b. Dow Chemical Company; DOWSIL 790 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - c. Dow Chemical Company; DOWSIL 791 Silicone Weatherproofing Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - d. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
 - e. Equivalents: As approved by Architect.
- C. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: White.
- D. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
 - 1. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Grade: ASTM C834; Grade Minus 18 Degrees C (0 Degrees F).
 - 3. Manufacturers:
 - a. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.

- b. Sherwin-Williams Company; 850A Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
- c. Substitutions: See Section 016000 - Product Requirements.

2.05 SELF-LEVELING SEALANTS

- A. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single-component, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
 - 1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
 - 2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: Gray.
 - 4. Color: To be selected by Architect from manufacturer's standard range.
 - 5. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
 - 6. Manufacturers:
 - a. Pecora Corporation; Pecora 300 SL (Self-Leveling): www.pecora.com/#sle.
 - b. Sika Corporation; Sikasil 728SL: www.usa-sika.com/#sle.
 - c. Equivalents: As approved by Architect.

2.06 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
 - 2. Open Cell: 40 to 50 percent larger in diameter than joint width.
 - 3. Manufacturers:
 - a. ADFAST Corporation; ADSEAL BR-2600 (Backer Rod): www.adfastcorp.com/#sle.
 - b. Nomaco, Inc: www.nomaco.com/#sle.
 - c. Equivalents: As approved by Architect.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

END OF SECTION

**SECTION 081113
HOLLOW METAL DOORS AND FRAMES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Fire-rated hollow metal doors and frames.
- C. Sound retardant hollow metal doors and frames.
- D. Hollow metal borrowed lites glazing frames.
- E. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

- A. Section 087100 - Door Hardware.
- B. Section 088000 - Glazing: Glass for doors and borrowed lites.
- C. Section 099123 - Interior Painting: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. ASCE: American Society of Civil Engineers.
- C. HMMA: Hollow Metal Manufacturers Association.
- D. NAAMM: National Association of Architectural Metal Manufacturers.
- E. NFPA: National Fire Protection Association.
- F. SDI: Steel Door Institute.
- G. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2018.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames 2020.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2020.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- J. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- K. BHMA A156.115 - Hardware Preparation In Steel Doors And Steel Frames 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.

- N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- O. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2017.
- P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- R. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
- T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2019.
- U. UL (DIR) - Online Certifications Directory Current Edition.
- V. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- W. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- E. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/#sle.
- B. Sound-Retardant Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Overly Door Company: www.overly.com/#sle.
 - 3. Approved Equal.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 3. Door Edge Profile: Manufacturers standard for application indicated.
 4. Typical Door Face Sheets: Flush.
 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire-Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gauge, 0.042 inch (1.0 mm), minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 3. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
- C. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gauge, 0.042 inch (1.0 mm), minimum.
 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
 4. Provide units listed and labeled by UL (DIR).
 - a. Attach fire rating label to each fire rated unit.
 5. Smoke and Draft Control Doors: Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
 - a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
 - c. Label: Include the "S" label on fire-rating label of door.

6. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 7. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
- D. Interior Doors, Sound Retardant:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 2. Door Core Material: Manufacturer's standard core material used in the manufacture of STC45 sound rated doors.
 3. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
 4. Door Face Sheets: Flush.
 5. Door Finish: Factory primed and field finished.
- E. Hardware:
1. Pemko Sound Seal System 3 - Atragal (STC47)
 2. Pemkow STC4131 Automatic Door Bottom

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Non-Fire Rated: Knock-down type.
 1. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
 1. Fire Rating: Same as door, labeled.
 2. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
- E. Sound-Rated Door Frames: Full profile/continuously welded type.
 1. Frame Metal Thickness: 14 gauge, 0.067 inch (1.7 mm), minimum.
 2. Frame Finish: Factory primed and field finished.
- F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- G. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches (102 mm) high to fill opening without cutting masonry units.
- H. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 1. Size: As indicated on drawings.
 2. Frame Material: 18 gauge, 0.0478 inch (1.21 mm), galvanized steel.
 3. Metal Finish: Gray polyester powder coating.
 4. Manufacturers:
 - a. All Metal Stamping: www.allmetalstamping.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

- B. Glazing: As specified in Section 088000, factory installed.
- C. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
 - 1. Manufacturers:
 - a. ITW Commercial Construction North America; ITW CCNA-Buildex Tekes Select Series: www.ITWBuildex.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- D. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Coat inside of frames to be installed in moist masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout sound retardant frames solid, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 087100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- F. Comply with glazing installation requirements of Section 088000.
- G. Coordinate installation of electrical connections to electrical hardware items.
- H. Touch up damaged factory finishes.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. Adjust sound retardant doors so that seals are fully engaged when door is closed.

- C. Test sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.

END OF SECTION

**SECTION 081613
FIBERGLASS DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass/Aluminum Hybrid doors.
- B. Fiberglass door frames.
- C. Fiberglass sidelite frames.

1.02 RELATED REQUIREMENTS

- A. Section 087100 - Door Hardware.
- B. Section 088000 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2010 (Reapproved 2018).
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.
- E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2014.
- F. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2017.
- G. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor 2013a.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- I. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- J. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
- C. Shop Drawings: Indicate layout and profiles; include assembly methods.
 - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
 - 2. Indicate wall conditions, door and frame elevations, sections, materials, gauges, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.
- D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures for both fiberglass and aluminum finishes.

- E. Verification Samples: Submit door surface samples for each finish specified, 10 inches (254 mm) by 10 inches (254 mm) in size, illustrating finishes, colors, and textures.
- F. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- G. Installer's Qualification Statement.
- H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Mark doors with location of installation, door type, color, and weight.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Deliver pre-assembled doors and frames with braces, spreaders, and packaging as required to prevent damage.
- D. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
 - 1. Store at temperature and humidity conditions recommended by manufacturer.
 - 2. Do not use non-vented plastic or canvas shelters.
 - 3. Immediately remove wet wrappers.
- E. Store in position recommended by manufacturer, elevated minimum 4 inches (102 mm) above grade, with minimum 1/4 inch (6.4 mm) space between doors.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide limited lifetime manufacturer warranty covering materials and workmanship including corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products for original installation.
- C. Provide ten (10) year manufacturer warranty covering materials and workmanship, including degradation or failure due to chemical contact and anodized aluminum finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Pultruded Fiberglass Reinforced Plastic (FRP) Doors with aluminum stiles and rails:
 - 1. Special-Lite, Inc: www.special-lite.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.

2.02 DOOR AND FRAME ASSEMBLIES

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
 - 1. Screw-Holding Capacity: Tested to 890 pounds (404 kg), minimum.
 - 2. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
 - 3. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
 - 4. Per 2020 BCNYS 2603.4.1.7 for non-rated swinging doors with plastic foam cores, provide a thermal barrier of not less than 0.032" thick aluminum or steel with basic thickness of not less than 0.016" between the foam core and FRP skin, unless the standard construction of the door assembly passes an independent test in conformance with 2020 BCNYS 2603.9.
 - 5. Clearance Between Door and Frame: 1/8 inch (3 mm), maximum.

6. Clearance Between Bottom of Door and Finished Floor: 3/4 inch (19 mm), maximum; not less than 1/4 inch (6 mm) clearance to threshold.

2.03 COMPONENTS

- A. Doors: Fiberglass construction with reinforced core.
 1. Thickness: 1-3/4 inch (44 mm), nominal.
 2. Core Material: Urethane foam.
 3. Construction:
 - a. Fiberglass faces 0.120 inches thick, attached to aluminum extruded stiles and rails with an applied gel coating on each side.
 4. Face Sheet Texture: Wood grain.
 5. Face Sheet Class:
 - a. Exterior: Class C
 6. Door Panel: Flush door.
 7. Subframe and Reinforcements: aluminum and steel.
 8. Corners: Mitered and secured with 3/8" tie rods connecting splines at top and bottom.
 9. Top Rail: Aluminum with interlocking continuous extruded aluminum flush cap.
 10. Bottom Rail: Aluminum with interlocking manually adjustable door bottom with double nylon brush weatherstripping .
 11. Meeting Stiles: Aluminum with Integral weatherstripping pocket.
 12. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations integral to fiberglass reinforced plastic (FRP) face sheets; provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
 13. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide extruded aluminum blocking; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.
- B. Door, Borrowed Lite, transom, and sidelite Frames: Provide type in compliance with performance requirements specified for doors.
 1. Type: Factory assembled with chemically welded joints.
 2. Thickness: 1/4 inch.
 3. Profiles: As indicated on drawings.
 4. Door Stop: 5/8 inch (15.9 mm) wide, by 2-1/4 inches deep.
 5. Removable stop on secure side.
 6. Non-Fire-Rated:
 - a. Fiberglass pultrusions with factory finish.
 7. Mullions: Fixed, fiberglass centerpost; 2 inches wide by 2-3/4 inches deep (51 mm wide by 70 mm deep), nominal.
 8. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant, Chemically Welded.
 9. Hardware Cut-outs: Provide continuous backing or mortar guards of same material as frame, with watertight seal.
 10. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches (2130 mm) with one additional anchor for each additional 24 inches (610 mm) in height.
 11. Reinforcing: Provide aluminum at hinge, strike and closer, fiberglass, and Aluminum reinforcing at all other locations.

2.04 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Air Leakage: Maximum of [0.26] cfm per square foot at [6.29] psf ([] L/sec/sq m at [] Pa) differential pressure, when tested in accordance with ASTM E283.

- C. Thermal Transmittance, Exterior Doors: AAMA 1503, U-value of 0.37, maximum, measured on exterior door in size required for this project.
- D. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:
 - 1. Izod Impact Resistance: ASTM D256, [3.9] foot-pound force per inch of width ([] Nm/25.4 mm of width), minimum, with notched izod.
 - 2. Tensile Strength at Break: ASTM D638, 79000 psi ([] MPa), minimum.
 - 3. Water Absorption: ASTM D570, 0.49 percent, maximum, after 24 hours at 74 degrees F (23 degrees C).
 - 4. Flexural Strength: ASTM D790, 27,000 psi (186.2 MPa), minimum.
 - 5. Barcol Hardness: ASTM D2583, minimum of 38 units.

2.05 FINISHES

- A. Aluminum: Aluminum extrusions made 6063 aluminum alloys
 - 1. Sheet and plate to conform to ASTM-B209.

2.06 ACCESSORIES

- A. Stops for Glazing and Louver: Fiberglass, unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, with color and texture to match door; fasteners shall maintain waterproof integrity.
 - 1. Exterior Doors: Provide non-removable stops on exterior side with continuous compression gasket weatherseal.
 - 2. Glazed Openings: Provide removable stops on interior side.
 - 3. Opening Sizes and Shapes: As indicated on drawings.
- B. Glazing: See Section 088000.
- C. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings.
 - 2. Frame Material: Manufacturer's Standard, galvanized steel, with finish to match door.
- D. Door Hardware: See Section 087100.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.
- B. Do not begin installation until substrates have been properly prepared.

3.02 PREPARATION

- A. Remove existing doors and frames, and dispose of all removed materials in accordance with local authorities having jurisdiction.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean and prepare substrate in accordance with manufacturer's directions.
- D. Protect adjacent work and finish surfaces from damage during installation.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Install exterior doors in accordance with ASTM E2112.
- C. Install door hardware as specified in Section 087100.
- D. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
- E. Set thresholds in continuous bed of sealant.

- F. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- G. Repair or replace damaged installed products.

3.04 ADJUSTING

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.

3.05 CLEANING

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

**SECTION 083100
ACCESS DOORS AND PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall and ceiling mounted access units.

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Field paint finish.
- B. Section 233300 - Air Duct Accessories: Access doors in ductwork.

1.03 REFERENCE STANDARDS

- A. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Project Record Documents: Record actual locations of each access unit.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Wall-Mounted Units:
 - 1. Location: As indicated on drawings or required on drawings or in specifications..
 - 2. Panel Material: Aluminum extrusions with gypsum board inlay.
 - 3. Size: As indicated or as required for use intended..
 - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 - 6. Plaster Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 - 7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- B. Fire-Rated Wall-Mounted Units:
 - 1. Location: Where indicated in Dwgs. and Specifications..
 - 2. Wall Fire-Rating: As indicated on drawings.
 - 3. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
 - 4. Size: As indicated or as required for use intended..
 - 5. Door/Panel: Uninsulated single-surface panel, with tool-operated spring or cam lock and no handle.
- C. Ceiling-Mounted Units:
 - 1. Location: As indicated in Drawings and Specifications..
 - 2. Panel Material: Aluminum extrusion with gypsum board inlay.
 - 3. Size: As indicated or required for intended use..
 - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
- D. Fire-Rated Ceiling-Mounted Units:
 - 1. Location: As indicated in Drawings and Specifications..
 - 2. Ceiling Fire-Rating: As indicated on drawings.
 - 3. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.

4. Size: As indicated or required for intended use..
5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 WALL AND CEILING MOUNTED ACCESS UNITS

- A. Manufacturers:
 1. ACUDOR Products Inc: www.acudor.com/#sle. Basis-of-Design
 - a. Wall and Ceiling Mounted Units: ACUDOR DW-5040.
 - b. Wall and Ceiling Mounted Fire rated Units: ACUDOR- 5015
 2. Babcock-Davis: www.babcockdavis.com/#sle.
 3. Best Access Doors: www.bestaccessdoors.com/#sle.
 4. MIFAB, Inc: www.mifab.com/#sle.
 5. Milcor, Inc: www.milcorinc.com/#sle.
- B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
 1. Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
 2. Style: .
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 - b. Plaster Mounting Criteria: Use plaster bead type frame.
 3. Door Style: Single thickness with rolled or turned in edges.
 4. Frames: 26 gauge, [] inch ([] mm), minimum thickness.
 5. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by UL (FRD) as suitable for purpose indicated.
 - b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
 6. Steel Finish: Primed.
 7. Primed and Factory Finish: Polyester powder coat; color [].
 8. Door/Panel Size: As indicated on drawings or as required..
 9. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - c. Latch/Lock: Tamperproof tool-operated cam latch.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
 - e. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
 - f. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

**SECTION 088000
GLAZING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glazing units.
- B. Plastic sheet glazing units.
- C. Glazing compounds.

1.2 RELATED REQUIREMENTS

- A. Section 072500 - Weather Barriers.
- B. Section 079200 - Joint Sealants: Sealants for other than glazing purposes.
- C. Section 081113 - Hollow Metal Doors and Frames : Glazed lites in doors and borrowed lites.
- D. Section 084313 - Aluminum-Framed Storefronts:
- E. Section 088723 - Safety and Security Films.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass 2021.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021a.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2019.
- L. GANA (GM) - GANA Glazing Manual 2008.
- M. GANA (SM) - GANA Sealant Manual 2008.
- N. GANA (LGRM) - Laminated Glazing Reference Manual 2009.
- O. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).
- P. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2020.
- Q. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2020.
- R. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2020.
- S. UL (DIR) - Online Certifications Directory Current Edition.

1.4 SUBMITTALS

- A. See Section 013300 - Submittal Procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Installer's qualification statement.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.
- B. All interior glazing sizes and types shall comply with NFPA 80 and/or ASTM E119.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- D. See Section 014000 - Quality Requirements for additional requirements.

1.6 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.
- C. Polycarbonate Sheet Glazing: Provide a five (5) year manufacturer warranty to include coverage for breakage, coating failure, abrasion resistance, including providing products to replace failed units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Glass Fabricators:
 - 1. Basis-of-Design-Guardian Glass, LLC
 - 2. Viracon, Inc: www.viracon.com/#sle.
 - 2. Equivalents: Approved Equal.
- B. Float Glass Manufacturers:
 - 1. Guardian Glass, LLC: www.guardianglass.com/#sle.
 - 2. Pilkington North America Inc: www.pilkington.com/na/#sle.

3. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
4. Equivalent: Approved Equal.

2.2 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 5. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on canopy, point-supported, spider wall, high-risk, sloping overhead, horizontal overhead, free-standing glass protective barrier, or other demanding applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with industry established testing requirements.
 6. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
 7. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.3 GLAZING UNITS

- A. Type G2 - Monolithic Interior Vision Glazing:
 1. Applications: Interior glazing unless otherwise indicated.
 2. Glass Type: Fully tempered float glass.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal.
 5. Glazing Method: Dry glazing method, gasket glazing.
 6. Manufacturers:
 - a. Guardian Glass, LLC; Basis of Design: www.guardianglass.com/#sle.
 - b. Equivalent: Approved equal.

2.4 PLASTIC SHEET GLAZING UNITS

- A. Type P-1 - Polycarbonate Flat Sheet: Ultraviolet (UV) stabilized.
 1. Applications: Locations as indicated on drawings.
 2. Type: Cellular (multi-wall, "structured") sheet.
 3. Silicone abrasion resistant coating for scratch resistance.
 4. Tint: Clear, transparent.
 5. Thickness: 0.157 inch.
 6. Width: 48 inch.
 7. Glazing Method: As required for application indicated on drawings.
 8. Manufacturers:
 - a. Covestro, LLC; Makrolon multi UV sheet, Structure 2/4-6: www.sheets.covestro.com/#sle.
 - b. SABIC Innovative Plastics US LLC; LEXAN THERMOCLEAR 15: www.sabic.com/sfs/#sle.

2.5 GLAZING COMPOUNDS

- A. Type GC-1 - Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; gray color.
- B. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

- C. Type GC-3 - Polysulfide Sealant: Two component; chemical curing, nonsagging type; ASTM C920 Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- D. Type GC-4 - Polyurethane Sealant: Single component, chemical curing, nonstaining, nonbleeding; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.
- E. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- F. Manufacturers:
 - 1. BASF Corporation: www.basf.com/#sle.
 - 2. Bostik Inc: www.bostik-us.com/#sle.
 - 3. Dow Corning Corporation: www.dowcorning.com/construction/#sle. Dow Corning Corporation: www.dowcorning.com/construction/#sle.
 - 4. Pecora Corporation: www.pecora.com/#sle.
 - 5. Tremco Commercial Sealants & Waterproofing; Proglaze SSG: www.tremcosealants.com/#sle.

2.6 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 - 1. Width: As required for application.
 - 2. Thickness: As required for application.
 - 3. Spacer Rod Diameter: As required for application.
 - 4. Manufacturers:
 - a. Pecora Corporation: www.pecora.com/#sle.
 - b. Tremco Global Sealants: www.tremcosealants.com/#sle.
 - c. Equivalent: Approved equal.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

2.7 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.

- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.5 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

3.6 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.7 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Place setting blocks at 1/4 points and install glazing pane or unit.
- C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- D. Fill gaps between glazing and stops with type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.8 INSTALLATION - WET GLAZING METHOD (COMPOUND AND COMPOUND)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- C. Locate and secure glazing pane using glazers' clips.
- D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.9 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - 1. Place glazing tape on glazing pane of unit with tape flush with sight line.
- G. Fill gap between glazing and stop with type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- H. Apply cap bead of type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.10 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

- D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- F. Fill gaps between pane and applied stop with type sealant to depth equal to bite on glazing, to uniform and level line.
- G. Carefully trim protruding tape with knife.

3.11 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

3.12 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.13 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

This page intentionally left blank

**SECTION 092116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Acoustic insulation.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 072100 - Thermal Insulation: Acoustic insulation.
- C. Section 078400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- D. Section 079200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- E. Section 092216 - Non-Structural Metal Framing .
- F. Section 093000 - Tiling: Tile backing board.

1.03 REFERENCE STANDARDS

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 2019.
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
- D. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board 2004 (Reapproved 2020).
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
- I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.
- J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2020.
- K. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.
- L. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- M. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel 2017.
- N. ASTM C1288 - Standard Specification for Fiber-Cement Interior Substrate Sheets 2017.
- O. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2021.
- P. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.

- Q. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
- R. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels 2019, with Editorial Revision (2020).
- S. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.
- T. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- U. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- V. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- W. ASTM E413 - Classification for Rating Sound Insulation 2016.
- X. GA-216 - Application and Finishing of Gypsum Panel Products 2016, with Errata.
- Y. GA-226 - Application of Gypsum Board to Form Curved Surfaces 2008.
- Z. UL (FRD) - Fire Resistance Directory Current Edition.
- AA. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing.

PART 2 PRODUCTS

2.01 GYP SUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies as indicated on drawings
 - 1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. CertainTeed Corporation: www.certainteed.com/#sle.
 - 2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 - 3. National Gypsum Company: www.nationalgypsum.com/#sle.
 - 4. USG Corporation: www.usg.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.

- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 3. Unfaced fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - b. Mold resistant board is required where indicated on drawings..
 5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 6. Thickness:
 - a. Vertical Surfaces: .
 - b. Ceilings: 1/2 inch (16 mm) unless otherwise indicated on drawings..
 - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
 7. Paper-Faced Products:
 - a. CertainTeed Corporation; Type C Drywall: www.certainteed.com/#sle.
 - b. CertainTeed Corporation; Type X Drywall: www.certainteed.com/#sle.
 - c. Georgia-Pacific Gypsum; ToughRock: www.gpgypsum.com/#sle.
 - d. Georgia-Pacific Gypsum; ToughRock Fireguard X: www.gpgypsum.com/#sle.
 - e. USG Corporation; USG Sheetrock Brand EcoSmart Panels Firecode X: www.usg.com/#sle.
 - f. USG Corporation; USG Sheetrock Brand Firecode X Panels: www.usg.com/#sle.
 - g. Substitutions: See Section 016000 - Product Requirements.
 - h. Equivalent: Approved equal.
 8. Mold Resistant Paper Faced Products:
 - a. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Mold-Guard: www.gpgypsum.com/#sle.
 - c. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: www.gpgypsum.com/#sle.
 - d. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com/#sle.
 - e. USG Corporation; USG Sheetrock Brand EcoSmart Panels Mold Tough Firecode X: www.usg.com/#sle.
 - f. Substitutions: See Section 016000 - Product Requirements.
 9. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: www.gpgypsum.com/#sle.
 - c. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
 - d. Substitutions: See Section 016000 - Product Requirements.
- C. Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind tile in wet areas including shower ceilings and where indicated on drawings..
 2. Application: Horizontal surfaces behind tile in wet areas including countertops and where indicated on drawings.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 4. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch (12.7 mm).

- b. Products:
 - 1) USG Corporation: www.usg.com/#sle.
 - 2) Equivalent: Approved equal.
- D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Ceilings, unless otherwise indicated.
 - 2. Thickness: 1/2 inch (13 mm).
 - 3. Edges: Tapered.
 - 4. Products:
 - a. CertainTeed Corporation; Interior Ceiling Drywall: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board: www.gpgypsum.com/#sle.
 - c. USG Corporation; 1/2 Inch Sheetrock Brand UltraLight Panels: www.usg.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.03 GYP SUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: To match partition thickness.
- B. Acoustical Shielding: Recycled ethylene vinyl acetate (EVA) sheet membrane; applied between studs and gypsum board.
 - 1. Sound Transmission Class (STC): Minimum of 25, calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
 - 2. Fire Resistance: Where fire-resistance rating is specified for the wall in which the acoustical shielding membrane is mounted, provide assemblies that have been tested in accordance with ASTM E119 for the same rating as the wall.
 - 3. Products:
 - a. Blue Ridge Fiberboard, a W.R. Meadows Company; Soundstop Sound-Abate: www.wrmeadows.com/#sle.
- C. Sound Isolation Tape: Elastomeric foam tape for sound decoupling.
 - 1. Surface Burning Characteristics: Provide assemblies with flame spread index of 75 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 2. Tape Thickness: 1/4 inch (6 mm).
 - 3. Products:
 - a. Armacell LLC; ArmaSound MTD: www.armacell.us/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- D. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
 - 1. Products:
 - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
 - b. Liquid Nails, a brand of PPG Architectural Coatings: www.liquidnails.com/#sle.
 - c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
- E. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 - 3. Products:
 - a. Same manufacturer as framing materials.
 - b. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.
 - c. Trim-tex, Inc: www.trim-tex.com/#sle.

- d. Substitutions: See Section 016000 - Product Requirements.
- F. Decorative Metal Trim:
 - 1. Material: Extruded aluminum alloy 6063-T5 temper.
 - 2. Finish: Anodized, clear.
 - 3. Type: Profile as selected from manufacturer's standard range.
 - 4. Corner Trim:
 - a. Products:
 - 1) As indicated on drawings..
 - 2) Schluter Systems.
 - 3) Substitutions: See Section 016000 - Product Requirements.
 - 5. Reveal Trim:
 - a. Products:
 - 1) As indicated on drawings..
 - 2) Schluter Systems.
 - 3) Substitutions: See Section 016000 - Product Requirements.
 - 6. Molding:
 - a. Products:
 - 1) As indicated on Drawings.
 - 2) Schluter Systems.
 - 3) Substitutions: See Section 016000 - Product Requirements.
- G. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
 - 3. Products:
 - a. Continental Building Products: www.continental-bp.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
 - 4. Joint Compound: Drying type, vinyl-based, ready-mixed.
 - a. Products:
 - 1) CertainTeed Corporation; Extreme All-Purpose Joint Compound: www.certainteed.com/#sle.
 - 2) Continental Building Products: www.continental-bp.com/#sle.
 - 3) Substitutions: See Section 016000 - Product Requirements.
 - 5. Joint Compound: Setting type, field-mixed.
- H. Finishing Compound: Surface coat and primer, takes the place of skim coating.
 - 1. Products:
 - a. CertainTeed Corporation; Quick Prep Plus Interior Prep Coat: www.certainteed.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- I. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
 - 1. Products:
 - a. CertainTeed Corporation; Level V Wall and Ceiling Primer/Surfer with M2Tech: www.certainteed.com/#sle.
 - b. USG Corporation; USG Sheetrock Brand Tuff-Hide Primer-Surfer: www.usg.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.
- J. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

- K. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- L. Nails for Attachment to Wood Members: ASTM C514.
- M. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- C. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place continuous bead at perimeter of each layer of gypsum board.
 - 2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- G. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- H. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.

3.05 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 3. Level 3: Walls to receive textured wall finish.
 4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 5. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
- D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.06 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

**SECTION 093000
TILING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Stone thresholds.
- D. Ceramic accessories.
- E. Ceramic trim.
- F. Non-ceramic trim.

1.2 RELATED REQUIREMENTS

- A. Section 079200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.3 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) 2019.
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017.
- C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
- D. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).
- E. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship 2019.
- F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive 2019.
- G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2021.
- H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy 1999 (Reaffirmed 2019).
- I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2019).
- J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).
- K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017.
- L. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- M. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2019).
- N. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).

- O. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.
- P. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar 2019.
- Q. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2021.
- R. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.
- S. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation 1999 (Reaffirmed 2021).
- T. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation 2019.
- U. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2019.
- V. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 2019.
- W. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation 2014 (Reaffirmed 2019).
- X. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014 (Reaffirmed 2019).
- Y. ANSI A118.13 - American National Standard Specification for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation 2014 (Reaffirmed 2019).
- Z. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2019.
- AA. ANSI A136.1 - American National Standard for Organic Adhesives for Installation of Ceramic Tile 2020.
- BB. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2021.
- CC. ANSI A137.2 - American National Standard Specifications for Glass Tile 2021.
- DD. ANSI A137.3 - American National Standard Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile Panels/Slabs 2021.
- EE. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- FF. ASTM C150/C150M - Standard Specification for Portland Cement 2021.
- GG. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products 2018.
- HH. ASTM C847 - Standard Specification for Metal Lath 2018.
- II. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- JJ. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane 2017.
- KK. ASTM E492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine 2009, with Editorial Revision (2016).

- LL. ASTM E2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors 2021.
- MM. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- NN. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- OO. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- PP. ICC-ES AC308 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).
- QQ. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2021.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Full-size samples of each type of trim and accessory for each color and finish required.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.
- G. Installer's Qualification Statement:
 - 1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.
 - 2. Submit documentation of completion of apprenticeship and certification programs.
 - 3. Submit documentation of Natural Stone Institute Accreditation.
- H. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Tile: 5 percent of each size, color, and surface finish combination, but not less than 5 of each type.

1.6 QUALITY ASSURANCE

- A. Maintain one copy of the ANSI A108/A118/A136 and the current TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.
 - a. Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA).

1.7 MOCK-UP

- A. See Section 014000 - Quality Requirements, for general requirements for mock-up.
- B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
 - 1. Minimum size of mock-up is indicated on drawings.
 - 2. Approved mock-up may remain as part of the Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.9 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.1 TILE

- A. Refer to Interior Drawings for Manufacturer, Product and Color..
- B. Substitutions: See Section 016000 - Product Requirements.

2.2 TRIM AND ACCESSORIES

- A. Ceramic Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
- B. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
 - 1. Applications: Where indicated on Interior Drawings.
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Jointed.
 - c. Floor to Wall Joints: Cove base.
 - 2. Manufacturers: Same as for tile.
- C. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
 - 1. Applications: As indicated on Interior Drawings, including but not limited to the following:
 - a. Open edges of wall tile.
 - b. Open edges of floor tile.
 - c. Wall corners, outside and inside.
 - d. Transition between floor finishes of different heights.
 - e. Thresholds at door openings.
 - f. Expansion and control joints, floor and wall.
 - g. Floor to wall joints.
 - h. Borders and other trim as indicated on drawings.
 - 2. Manufacturers:
 - a. Schluter-Systems: www.schluter.com/#sle. Basis of Design
 - b. Substitutions: See Section 016000 - Product Requirements.

- D. Thresholds: 4 inches wide by full width of wall or frame opening; beveled edge on both long edges; without holes, cracks, or open seams.

2.3 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.

- B. Manufacturers:
 - 1. Custom Building Products; www.custombuildingproducts.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 - 1. Applications: Use this type of bond coatd for all products larger than 15".
 - 2. Products:
 - a. Custom Building Products Pro Lite Premium Large Format Tile Mortarwww.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- D. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 - 1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
 - 2. Products:
 - a. Custom Building Products; Versa Bond Professional Thin-Set Mortar; www.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- E. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
 - 1. Applications: Use this type of bond coat where Large and Heavy Tile (LHT) mortar is indicated.
 - 2. Products:
 - a. Custom Building Products; MegaLite Ultimate Crack Prevention Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- F. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
 - 1. Applications: Where indicated on drawings.
 - 2. Products:
 - a. Custom Building Products; EBM-Lite Epoxy Bonding Mortar: www.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- G. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
 - 1. Products:
 - a. Custom Building Products: Thick Bed Mortar.
 - b. Substitutions: See Section 016000 - Product Requirements.

2.4 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
 - 1. Custom Building Products; www.custombuildingproducts.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- C. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): As selected by Architect from manufacturer's full line.
 - 4. Products:
 - a. Custom Building Product: Prism Ultimate Performance Grout www.custombuildingproducts.com/#sle.

- b. Substitutions: See Section 016000 - Product Requirements.
- D. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
 - 1. Applications: Where indicated on Interior Drawings.
 - 2. Color(s): As selected by Architect from manufacturer's full line.
 - 3. Products:
 - a. Custom Building Products; CEG-Lite 100% Solids Commercial Epoxy Grout: www.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

2.5 MAINTENANCE MATERIALS

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
 - 1. Applications: Between tile and plumbing fixtures.
 - 2. Color(s): As selected by Architect from manufacturer's full line.
 - 3. Products:
 - a. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

2.6 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
 - 1. Crack Resistance: No failure at 1/8 inch gap, minimum.
 - 2. Fluid or Trowel Applied Type:
 - a. Thickness: Mils as per manufacturer..
 - b. Products:
 - 1) Custom Building Products; RedGard Liquid Applied Membrane
 - 2) Substitutions: See Section 016000 - Product Requirements.
- B. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 - 1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
 - 2. Fluid or Trowel Applied Type:
 - a. Thickness: Per Manufacturer mils, minimum, dry film thickness.
 - b. Products:
 - 1) Custom Building Products; RedGard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
- C. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
 - 1. Products:
 - a. Custom Building Products; WonderBoard Lite Backerboard: www.custombuildingproducts.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.
 - 3. Follow moisture and alkalinity remediation procedures in Section 090561.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19 , manufacturer's instructions, and current TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Install thresholds where indicated.
- I. Sound tile after setting. Replace hollow sounding units.
- J. Keep control and expansion joints free of mortar, grout, and adhesive.
- K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- N. Install movement joints in accordance with TCNA (HB) Method EJ171F.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

1. Use uncoupling membrane under all tile unless other underlayment is indicated.
2. Where epoxy bond coat and grout are indicated, install in accordance with TCNA (HB) Method F131.
3. Where epoxy or furan grout is indicated, but not epoxy or furan bond coat, install in accordance with TCNA (HB) Method F115.

B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.5 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.

B. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

C. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.

D. Install movement joints in accordance with TCNA (HB) Method EJ171F.

3.6 CLEANING

A. Clean tile and grout surfaces.

3.7 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

**SECTION 095100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED REQUIREMENTS

- A. Section 211300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
- B. Section 233700 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- C. Section 265100 - Interior Lighting: Light fixtures in ceiling system.
- D. Section 275116 - Public Address Systems: Speakers in ceiling system.
- E. Section 284600 - Fire Detection and Alarm: Fire alarm components in ceiling system.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2019.
- D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2020.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Evaluation Service Reports: Show compliance with specified requirements.
- D. Samples: Submit two samples 4 by 4 inch in size illustrating material, edge condition and finish of acoustical units.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.06 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. Armstrong World Industries, Inc; Basis of Design: www.armstrongceilings.com/#sle.
 - 2. USG Corporation: www.usg.com/ceilings/#sle.
 - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Suspension Systems:
 - 1. Armstrong World Industries, Inc; Basis of Design: www.armstrongceilings.com/#sle.
 - 2. USG Corporation: www.usg.com/ceilings/#sle.
 - 3. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

2.03 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels: Glass fiber with membrane-faced overlay, with the following characteristics:
 - 1. Classification: ASTM E1264 Type XII.
 - a. Form: 2, cloth.
 - b. Pattern: "E" - lightly textured.
 - c. Fire Class: Class A-Flame spread rating of 25 or less, Smoke developed index of 50 or less, per ASTM E84.
 - 2. Size: As indicated on Drawings..
 - 3. Thickness: 3/4 inch.
 - 4. Acoustical Performance:
 - 5. Light Reflectance: .88 percent, determined in accordance with ASTM E1264.
 - 6. NRC Range: 0.90, determined in accordance with ASTM E1264.
 - 7. Articulation Class (AC): 190, determined in accordance with ASTM E1264.
 - 8. Panel Edge: Tegular.
 - 9. Tile Edge: Square.
 - 10. Color: White.
 - 11. Suspension System: Exposed-As indicated on Interior Finish Schedule.
 - 12. Products:
 - a. Armstrong World Industries, Inc; Optima: www.armstrongceilings.com/#sle.
- C. Acoustical Panels: Glass fiber with membrane-faced overlay, with the following characteristics:
 - 1. Application(s): ACT-6.
 - 2. Classification: ASTM E1264 Type XII.
 - a. Form: 2, cloth.
 - b. Pattern: "E" - lightly textured.
 - c. Fire Class: Class A-Flame spread rating of 25 or less, Smoke developed index of 50 or less, per ASTM E84.
 - 3. Size: As indicated on Drawings..
 - 4. Thickness: 1 1/2 inches.
 - 5. Light Reflectance: .88 percent, determined in accordance with ASTM E1264.
 - 6. NRC Range: 1.00, determined in accordance with ASTM E1264.
 - 7. Articulation Class (AC): 200, determined in accordance with ASTM E1264.
 - 8. Ceiling Attenuation Class (CAC): [____], determined in accordance with ASTM E1264.
 - 9. Panel Edge: Tegular.
 - 10. Tile Edge: Square.
 - a. Joint: Kerfed and rabbeted.
 - 11. Color: White.
 - 12. Suspension System: Exposed-As indicated on Interior Finish Schedule.
 - 13. Products:
 - a. Armstrong World Industries, Inc; Optima: www.armstrongceilings.com/#sle.

- b. Substitutions: See Section 016000 - Product Requirements.

2.04 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid and cap.
1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 2. Profile: Tee; face width as indicated on Drawings
 3. Finish: Baked enamel.
 4. Color: To match ceiling tiles.
 5. Products:
 - a. Armstrong Industries; Prelude XL 15/16 inch Acoustical Suspension System. Basis-of-Design..
 - b. Approved Equal.
 6. Configuration: As designed by manufacturer for intended panels.
 7. Provide all accessories required to provide complete installation.
 8. Products:
 - a. Armstrong World Industries, Soundscapes suspension kits..
 - b. Substitutions: See Section 016000 - Product Requirements.

2.05 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
1. Size: As required for installation conditions and specified Seismic Design Category.
 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 3. Shadow Molding: Shaped to create a perimeter reveal.
 4. Channel Molding: U-shaped, for hold-down type installations.
 5. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 095100

**SECTION 096500
RESILIENT FLOORING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient sheet flooring
- B. Resilient tile flooring.
- C. Resilient base.
- D. Installation accessories.

1.2 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

1.3 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- C. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading 2017.
- D. ASTM F1344 - Standard Specification for Rubber Floor Tile 2021a.
- E. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile 2020.
- F. ASTM F1861 - Standard Specification for Resilient Wall Base 2021.
- G. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- H. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing 2019.
- I. ASTM F2169 - Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).
- J. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- K. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.
- L. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings 2011.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Verification Samples: Submit two samples, 8 by 8 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 5% of each type and color.

3. Extra Wall Base: 5% of each type and color.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.
- D. Warranty:
 1. Copy of manufacturers' 15 year warranty for Omnisports HPL 9.
 2. Copy of manufacturer's 10 year warranty for Norament Grano Tile.
 3. Copy of manufacturer's 15 year warranty for Armstrong Empower Tile.
 4. Copy of manufacturer's 20 year warranty for Armstrong Natural Creations.
 5. Copy of manufacturer's 10 year warranty for Armstrong Medintech/Medintone.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

1.7 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 SHEET FLOORING

- A. Vinyl Sheet Flooring: Homogeneous without backing, with color and pattern throughout full thickness.
 1. Manufacturers:
 - a. Armstrong Flooring, Inc; Medintone with Diamond 10 Technology Coating: www.armstrongflooring.com/#sle.
 2. Minimum Requirements: Comply with ASTM F1913.
 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 4. Thickness: 0.080 inch nominal.
 5. Sheet Width: 6 feet - 7 inch minimum.
 6. Static Load Resistance: 2000 psi minimum, when tested as specified in ASTM F970.
 7. Seams: Heat welded.
 8. Color: As indicated on drawings.
- B. PVC Resilient Sheet Flooring: Multi-layer PVC Resilient Sheet with high density base matt.
 1. Manufacturers:
 - a. Tarkett Sports: Omnisport HPL 9: Basis of Design: www.tarkett.com/#sle
 2. Critical Radiant Flux (CRF): Class 1, when tested in accordance with ASTM E648 or NFPA 253.

3. Thickness: 0.7 mm nominal.
4. Sheet Width: 6.5 feet minimum.
5. Static Load Resistance: 500 psi minimum, when tested as specified in ASTM F970.
6. Seams: Heat welded.
7. Color: As indicated on drawings.

C. Welding Rod: Solid bead in material compatible with flooring, produced by flooring manufacturer for heat welding seams, and in color matching field color.

2.2 TILE FLOORING

A. Vinyl Tile: Printed film type, with transparent or translucent wear layer; acoustic interlayer or backing.

1. Manufacturers:
 - a. Armstrong Flooring: Natural Creations with Diamond 10 Technology: Basis of Design: www.armstrong.com/#sle
2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648.
3. Plank Tile Size: As indicated on Drawings.
4. Wear Layer Thickness: 0.5 mm..
5. Total Thickness: 3.2 mm.
6. Factory Finish: Armstrong Diamond 10
7. Tile Edge: bevel.
8. Pattern: As indicated on Drawings..
9. Color: As indicated on drawings.

B. Vinyl Tile: Printed film type, with transparent or translucent wear layer; acoustic interlayer or backing.

1. Manufacturers:
 - a. Armstrong Flooring: Empower Rigid Core with Diamond 10 Technology: Basis of Design: www.armstrong.com/#sle
2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648.
3. Plank Tile Size: 9 x 72 inch.
4. Wear Layer Thickness: 0.5 mm..
5. Total Thickness: 7 mm.
6. Factory Finish: Armstrong Diamond 10
7. Tile Edge: bevel.
8. Pattern: As indicated on Drawings..
9. Color: As indicated on drawings.

C. Rubber Tile: homogenous rubber.

1. Manufacturers:
 - a. Nora Systems, Inc.: Norament Grano Tile: Basis of Design; www.nora.com/#sle
2. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
4. Size: 39.53 inches x 39.53 inches nominal.
5. Total Thickness: 3.5 mm..
6. Texture: Hammered.
7. Color: As indicated on drawings.

2.3 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset.
 - 1. Manufacturers:
 - a. Roppe Corp: Basis of Design www.roppe.com/#sle.
 - b. Equivalent: Approved equal.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - 3. Smoke density Class B less than 450, when tested in accordance with ASTM E84
 - 4. Profile: As indicated on Drawings.
 - 5. Height: As indicated on Drawings.
 - 6. Thickness: 0.125 inch.
 - 7. Finish: Satin.
 - 8. Length: 4 foot sections.
 - 9. Color: As indicated on drawings.

2.4 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
 - 1. VOC Content Limits: As specified in Section 016116.
- C. Adhesive for Vinyl and Rubber Flooring:
 - 1. Manufacturers:
 - a. As recommended by the manufacturer..
 - b. Equivalent: Approved equal.
- D. Moldings, Transition and Edge Strips: As indicated on Drawings..
 - 1. Manufacturers:
 - a. Tarkett Company
 - b. Schluter Systems.
- E. Filler for Coved Base: Plastic.
- F. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Loose-Laid Installation: Set flooring in place in accordance with manufacturer's instructions.
- E. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
 - 2. Resilient Strips: Attach to substrate using adhesive.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- H. Install flooring in recessed floor access covers, maintaining floor pattern.

3.4 INSTALLATION - SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Cut sheet at seams in accordance with manufacturer's instructions.
- C. Seal seams by heat welding where indicated.

3.5 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams as indicated on Interior Drawings to building lines to produce symmetrical pattern.
- C. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.6 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, follow manufacturer's instructions.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.7 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.8 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

**SECTION 096813
TILE CARPETING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Walk-off Mat Carpet Tile

1.02 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; and method of installation.
- C. Shop Drawings: Indicate layout of joints.
- D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.05 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 WALKOFF CARPET TILE

- A. Manufacturers:
 - 1. J+J Flooring Group: Runway II Walkoff: Basis of Design: jjflooringgroup.com/#sle
 - 2. Equivalent: Approved Equal.
- B. Walkoff Carpet Tile : Manufactured from one dye lot.
 - 1. Product: Subject to requirements provide products listed on drawings or Approved Equal.
 - 2. Pattern: As indicated on drawings..

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Adhesives:
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in pattern listed on drawings.
- F. Locate change of color or pattern between rooms under door centerline.
- G. Fully adhere carpet tile to substrate.
- H. Trim carpet tile neatly at walls and around interruptions.
- I. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION 096813

**SECTION 099123
INTERIOR PAINTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Prime surfaces to receive wall coverings.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Glass.
 - 8. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 055000 - Metal Fabrications : Shop-primed items.
- C. Section 099600 - High-Performance Coatings.
- D. Section 220553 - Identification for Plumbing Piping and Equipment: Painted identification.
- E. Section 230553 - Identification for HVAC Piping and Equipment-CPL: Painted identification.
- F. Section 260553 - Identification for Electrical Systems: Painted identification.
- G. Section 260553 - Identification for Electrical Systems: Color coding scheme for items to be painted under this section.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2019.

- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.
- D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
- F. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- G. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. PPG Paints: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle. Basis of Design
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 016000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 5. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of the State in which the Project is located.
 - c. USGBC LEED Rating System; for interior wall and ceiling finish (all coats), anti-corrosive paints on interior ferrous metal, sanding sealers, other sealers, and floor coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.

1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

- A. Interior Surfaces to be Painted, As Indicated in Interior Finish Schedule: Including gypsum board and plaster.
 1. Two top coats and one coat primer.
 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138.
 - a. Products:
 - 1) Sherwin-Williams Pro Industrial HP Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #115)
 - 2) Substitutions: Section 016000 - Product Requirements.
- B. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, plaster, and acoustical ceilings.
 1. Two top coats and one coat primer.
 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138.
 - a. Products:
 - 1) Sherwin-Williams ProMar 200 HP Series, Low Gloss Eg-Shel. (MPI #138)
 - 2) Substitutions: Section 016000 - Product Requirements.
 3. Top Coat Sheen:
 - a. Eggshell: MPI gloss level 3; use this sheen at all locations.
 4. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including ferrous metals, primed steel and galvanized steel:
 1. Medium duty applications include door frames and other metal applications.
 2. Two top coats and one coat primer.
 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
 - a. Products:
 - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Semi-Gloss. (MPI #115)
 - 2) Substitutions: Section 016000 - Product Requirements.
 4. Top Coat Sheen:
 - a. Satin: MPI gloss level 4; use this sheen at all locations.
 5. Primer: As recommended by top coat manufacturer for specific substrate.
- D. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
 1. One coat of latex primer sealer.
 2. Semi-gloss: Two coats of latex enamel.
- E. Concrete/Masonry, Opaque, Latex, 3 Coat:
 1. One coat of block filler.
 2. Sherwin-Williams ProMar 200 HP Series, Low Gloss Eg-Shel. (MPI #138)

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- K. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer . Protect from corrosion until coated.
- L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.
- B. Inspect and test questionable coated areas in accordance with Architect's Direction.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

**SECTION 123200
MANUFACTURED WOOD CASEWORK****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Manufactured standard casework.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: VOC limitations for adhesives and sealants.
- B. Section 061000 - Rough Carpentry: Blocking and nailers for anchoring casework.
- C. Section 079200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
- D. Section 092216 - Non-Structural Metal Framing : Reinforcements in metal-framed partitions for anchoring casework.
- E. Section 096500 - Resilient Flooring: Resilient wall base.
- F. Section 123600 - Countertops: Additional requirements for countertops.

1.03 DEFINITIONS

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches (1.066 m) above finished floor, tops of cases less than 72 inches (1.82 m) above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches (1.828 m) above finished floor and bottoms of cabinets more than 30 inches (0.762 m) but less than 42 inches (1.066 m) above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches (762 mm) above finished floor.

1.04 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Component dimensions, configurations, construction details, joint details, attachments.
- C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.
- D. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 2 inches by 3 inches (51 mm by 75 mm).
 - 1. Plastic laminate samples, for color, texture, and finish selection.
- E. Manufacturer's Qualification Statement.
- F. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Spare Parts: 5% additional latch and locking hardware.
- H. Finish touch-up kit for each type and color of materials provided.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.
- B. Acceptance at Site:
 - 1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- C. Storage:
 - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
 - 1. Ruptured, cracked, or stained finish coating.
 - 2. Discoloration or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Delamination of components.
 - 5. Failure of adhesives.
 - 6. Failure of hardware.

PART 2 PRODUCTS**2.01 CASEWORK, GENERAL**

- A. Quality Standard: AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Types: More than one type is required. See drawings for location of each type of casework.
- C. Plastic Laminate Faced Cabinets: Custom Grade.

2.02 FABRICATION

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
- B. Construction: As required for selected grade.
- C. Structural Performance: Safely support the following minimum loads:
 - 1. Base Units: 500 pounds per linear foot (744 kgs/linear m) across the cabinet ends.
 - 2. Suspended Units: 300 pounds (136 kg) static load.
 - 3. Drawers: 125 pounds (57 kg), minimum.
 - 4. Hanging Wall Cases: 300 pounds (135 kg).
 - 5. Shelves: 100 pounds (45 kg), minimum.
- D. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.
- E. Hardware Application: Factory-machine casework members for hardware that is not surface applied.
- F. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.

- G. Removable back panels on all base cabinets. Provide partial height back panels at sink cabinets.
- H. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- I. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
- J. Countertop Panel-Type Supports: Materials similar to adjacent casework, 1-1/2 inch (38 mm) in width, with front-to-back and toe space dimensions matching base cabinet. Designed to be secured in a concealed fashion to countertop material. Include two leveling devices per support panel.

2.03 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Plastic-Laminate-Clad Casework: Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
 - 1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
 - 2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
 - a. Base Cabinets: 24 inches (610 mm).
 - b. Tall Cabinets: As indicated on Drawings..
 - c. Wall Cabinets: 13 inches (330 mm).
 - 3. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
 - a. Finish: Matte or suede, gloss rating of 5 to 20.
 - b. Surface Color and Pattern: As indicated on drawings.
 - c. Exposed Interior Surfaces: Thermally fused laminate.
 - 1) Color: White.
 - d. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 1) Matching Wood Grain Pattern: Comply with requirements of quality standard for specified grade and as follows:
 - (a) Provide center matched panels at each elevation.
 - e. Cap exposed plastic laminate finish edges with trim indicated on details..

2.04 COUNTERTOPS

- A. Countertops: As specified in Section 123600.

2.05 CABINET HARDWARE

- A. Manufacturer's standard types, styles and finishes.
- B. Locks: Provide locks on casework drawers and doors where indicated. Lock with 5 pin cylinder and 2 keys per lock.
 - 1. Hinged Doors: Cam type lock, satin chromium plated over nickel on base material.
 - 2. Keying: Key locks as directed.
- C. Shelves in Cabinets:
 - 1. Shelf Standards and Rests: Vertical standards with rubber button fitted rests, satin chromium plated over nickel on base material.
- D. Swinging Doors: Hinges, pulls, and catches.
 - 1. Hinges: Semi-concealed, number as required by referenced standards for width, height, and weight of door.
 - a. Semi-Concealed Hinges: Installed as required by hinge design, satin chromium plated over nickel on base material.
 - 1) Butt hinges installed on cabinet face, and on door face; five-knuckle, projecting barrel, minimum 2-1/2 inches long (five-knuckle, projecting barrel, minimum 64

mm long).

2. Pulls: Satin chrome wire pulls, 4 inches (102 mm) wide.
 3. Catches: Magnetic.
- E. Drawers: Pulls and slides.
1. Pulls: Satin chrome wire pulls, 4 inches (102 mm) wide.
 2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.06 MATERIALS

- A. Adhesives Used for Assembly: Comply with VOC requirements for adhesives and sealants as specified in Section 016116.
- B. Wood-Based Materials:
1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.
 2. Composite Wood Panels: Containing no urea-formaldehyde resin binders.
- C. Concealed Solid Wood or Plywood: Any species and without defects affecting strength or utility.
- D. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications, complying with Grade requirements, and standard with the manufacturer.
- E. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.

2.07 ACCESSORIES

- A. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
1. Color: As selected by Architect from manufacturer's standard range.
 2. Use at exposed edges.
 3. Use at exposed shelf edges.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- C. Concealed Joint Fasteners: Corrosion-resistant, standard with manufacturer.
- D. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.
- E. Sealant for Use in Casework Installation:
1. Manufacturer's recommended type.

PART 3 EXECUTION

3.01 PREPARATION

3.02 EXAMINATION

- A. Site Verification of Environmental Conditions:
1. Do not deliver casework until the following conditions have been met:
 - a. Building has been enclosed (windows and doors sealed and weather-tight).
 - b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
 - c. Ceiling, overhead ductwork, piping, and lighting have been installed.
 - d. Installation areas do not require further "wet work" construction.
- B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch (13 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

- C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 - 1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more, and/or maximum variation from plumb exceeds 1/4 inch (6 mm) per story.
 - 2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.
- D. Verify adequacy of support framing and anchors.
- E. Verify that service connections are correctly located and of proper characteristics.

3.03 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
 - 2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
 - 3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
 - 4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).
- F. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- G. Install hardware uniformly and precisely.
- H. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.
- I. Replace units that are damaged, including those that have damaged finishes.

3.04 ADJUSTING

- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.05 CLEANING

- A. Clean casework and other installed surfaces thoroughly.

3.06 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.
- C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

**SECTION 123600
COUNTERTOPS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Countertops for manufactured casework.
- B. Wall-hung counters and vanity tops.

1.02 RELATED REQUIREMENTS

- A. Section 064100 - Architectural Wood Casework.
- B. Section 123200 - Manufactured Wood Casework.

1.03 REFERENCE STANDARDS

- A. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- E. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- F. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- G. PS 1 - Structural Plywood 2009 (Revised 2019).

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

- A. Quality Standard: See Section 123100.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
 - 1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch (1.2 mm) nominal thickness.
 - a. Manufacturers:
 - 1) Arborite: www.arborite.com/#sle.
 - 2) Formica Corporation: www.formica.com/#sle.
 - 3) Wilsonart: www.wilsonart.com/#sle.
 - 4) Substitutions: See Section 016000 - Product Requirements.
 - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
 - d. Finish: Matte or suede, gloss rating of 5 to 20.
 - e. Surface Color and Pattern: As indicated on drawings.
 - 2. Exposed Edge Treatment: Molded PVC edge with T-spline, sized to completely cover edge of panel.
 - a. Color: As selected by Architect from the manufacturer's full line.
 - 3. Back and End Splashes: Same material, same construction.
 - 4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.
- C. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
 - 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - 1) As indicated on Drawings.
 - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - c. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - d. Color and Pattern: As indicated on drawings.
 - 3. Other Components Thickness: 1/2 inch (12 mm), minimum.
 - 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch (32 mm) thick; square edge.
 - 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
 - 6. Skirts: As indicated on drawings.
 - 7. Fabricate in accordance with manufacturer's standard requirements.

2.02 MATERIALS

- A. Extruded Aluminum: ASTM B211/B211M, 6463 alloy, T5 temper.
- B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.
- C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 2. Height: 4 inches (102 mm), unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
- D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).
- C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.
- B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.
- C. Field Joints: 1/8 inch (3 mm) wide, maximum.

3.05 CLEANING

- A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

**SECTION 210500
COMMON WORK RESULTS FOR FIRE SUPPRESSION****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Above ground piping.
- B. Escutcheons.
- C. Mechanical couplings.
- D. Pipe hangers and supports.
- E. Pipe sleeves.
- F. Pipe sleeve-seal systems.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 210523 - General-Duty Valves for Water-Based Fire-Suppression Piping.
- C. Section 211300 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

1.3 REFERENCE STANDARDS

- A. ASME A112.18.1 - Plumbing Supply Fittings 2018, with Errata.
- B. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2021.
- E. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250 2021.
- F. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
- G. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).
- H. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- I. ASTM A536 - Standard Specification for Ductile Iron Castings 1984, with Editorial Revision (2019).
- J. ASTM A795/A795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use 2021.
- K. AWWA C606 - Grooved and Shouldered Joints 2015.
- L. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information. Indicate valve data and ratings.
- C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, and floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

- D. Manufacturer's qualification statement.
- E. Installer's qualification statement.
- F. Project Record Documents: Record actual locations of components and tag numbering.
- G. Operation and Maintenance Data: Include installation instructions and spare parts lists.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
 - 1. Minimum three years experience.
- C. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers, with labeling in place.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

1.7 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Sprinkler-based System:
 - 1. Comply with NFPA 13.
 - 2. See Section 211300.
- B. Welding Materials and Procedures: Comply with ASME BPVC-IX.
- C. Provide system pipes, fittings, sleeves, escutcheons, seals, and other related accessories.

2.2 ABOVE GROUND PIPING

- A. Steel Pipe: ASTM A53 Schedule 40, galvanized.
 - 1. Steel Fittings: ASME B16.5 steel flanges and fittings.
 - 2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.
 - 3. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.
 - 4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.
 - 5. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement onto pipe.

2.3 ESCUTCHEONS

- A. Manufacturers:
 - 1. Fire Protection Products, Inc; [_____]: www.fppi.com/#sle.com/#sle.
 - 2. Tyco Fire Protection Products; [_____]: www.tyco-fire.com/#sle.
 - 3. Viking Group Inc; [_____]: www.vikinggroupinc.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Material:
 - 1. Metals and Finish: Comply with ASME A112.18.1.

C. Construction:

1. One-piece for mounting on chrome-plated tubing or pipe and one-piece or split-pattern type elsewhere.
2. Internal spring tension devices or setscrews to maintain a fixed position against a surface.

2.4 PIPE HANGERS AND SUPPORTS

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.

2.5 MECHANICAL COUPLINGS**A. Manufacturers:**

1. Anvil International; [_____]: www.anvilintl.com/#sle.
2. Shurjoint Piping Products, Inc; [_____]: www.shurjoint.com/#sle.
3. Tyco Fire Protection Products; [_____]: www.tyco-fire.com/#sle.
4. Victaulic Company; FireLock Style 009H: www.victaulic.com/#sle.

B. Rigid Mechanical Couplings for Grooved Joints:

1. Dimensions and Testing: Comply with AWWA C606.
2. Minimum Working Pressure: 300 psig.
3. Housing Material: Fabricate of ductile iron complying with ASTM A536.
4. Housing Coating: Factory applied orange enamel.
5. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F to 230 degrees F.
6. Bolts and Nuts: Hot-dipped-galvanized or zinc-electroplated steel.

PART 3 EXECUTION**3.1 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building space, to not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 2. Place hangers within 12 inches of each horizontal elbow.
 3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- H. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.
- I. Structural Considerations:
 - 1. Do not penetrate building structural members unless indicated.
- J. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- K. Escutcheons:
 - 1. Install and firmly attach escutcheons at piping penetrations into finished spaces.
 - 2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
 - 3. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.
- L. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.

3.3 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.
- C. See Section 017419 - Construction Waste Management and Disposal for additional requirements.

END OF SECTION

SECTION 210523
GENERAL-DUTY VALVES FOR WATER-BASED FIRE-SUPPRESSION PIPING

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Ball valves with indicators.
- B. Iron butterfly valves with indicators.
- C. Check valves.
- D. Iron OS&Y gate valves.
- E. Trim and drain valves.

1.2 RELATED REQUIREMENTS

- A. Section 210553 - Identification for Fire Suppression Piping and Equipment.
- B. Section 211300 - Fire-Suppression Sprinkler Systems.

1.3 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- C. ASME B31.9 - Building Services Piping 2020.
- D. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators 2021.
- E. AWWA C606 - Grooved and Shouldered Joints 2015.
- F. FM (AG) - FM Approval Guide current edition.
- G. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL (DIR) - Online Certifications Directory Current Edition.
- I. UL 1091 - Standard for Butterfly Valves for Fire-Protection Service Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Obtain valves for each valve type from single manufacturer.

16128.00

GENERAL-DUTY VALVES FOR
WATER-BASED FIRE-
SUPPRESSION PIPING

210523 - 2

2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Where listed products are specified, provide products listed, classified, and labeled by FM (AG) or UL (DIR) as suitable for the purpose indicated.
- C. Welding Materials and Procedures: Comply with ASME BPVC-IX.
- D. Installer, Maintenance Contractor, and [] Qualifications:
 1. Company specializing in performing the work of this section with minimum five years documented experience.
 2. Trained and approved by manufacturer to design, install, test and maintain the equipment specified herein.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 1. Protect internal parts against rust and corrosion.
 2. Protect threads, flange faces, and weld ends.
 3. Set valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 1. Maintain valve end protection and protect flanges and specialties from dirt.
 - a. Provide temporary inlet and outlet caps.
 - b. Maintain caps in place until installation.
 2. Store valves in shipping containers and maintain in place until installation.
 - a. Store valves indoors and maintain at higher than ambient dew point temperature.
 - b. If outdoor storage is unavoidable, store valves off the ground in watertight enclosures.
- C. Use the following precautions for handling:
 1. Do not use operating handles or stems as lifting or rigging points.

PART 2 PRODUCTS**2.1 GENERAL REQUIREMENTS**

- A. UL Listed: Provide valves listed in UL (DIR) under following headings and bearing UL mark:
 1. Main Level: VDGT - Sprinkler System & Water Spray System Devices.
 - a. Level 1: VQGU - Valves, Trim, and Drain.
- B. FM Global Approved: Provide valves listed in FM (AG) Approval Guide under the following headings:
 1. Automated Sprinkler Systems:
 - a. Valves:
- C. ASME Compliance:
 1. ASME B16.1 for flanges on iron valves.
 2. ASME B1.20.1 for threads on threaded-end valves.
 3. ASME B31.9 for building services piping valves.
- D. Comply with AWWA C606 for grooved-end connections.
- E. Comply with NFPA 13 for valves.
- F. Valve Pressure Ratings: Not less than minimum pressure rating indicated or higher as required.
- G. Valve Sizes: Same as upstream piping unless otherwise indicated.

16128.00

GENERAL-DUTY VALVES FOR
WATER-BASED FIRE-
SUPPRESSION PIPING

210523 - 3

2.2 TWO-PIECE BALL VALVES WITH INDICATORS

- A. UL 1091, except with ball instead of disc and FM (AG) standard listing for indicating valves (butterfly or ball type), Class Number 1112.
- B. Description:
 - 1. Minimum Pressure Rating: 175 psig.
 - 2. Body Design: Two piece.
 - 3. Body Material: Forged brass or bronze.
 - 4. Port Size: Full or standard.
 - 5. Seat: PTFE.
 - 6. Stem: Bronze or stainless steel.
 - 7. Ball: Chrome-plated brass.
 - 8. Actuator: Worm gear or traveling nut.
 - 9. Supervisory Switch: Internal or external.
 - 10. End Connections for Valves 1 NPS through 2 NPS: Threaded ends.
 - 11. End Connections for Valves 2-1/2 NPS: Grooved ends.

2.3 IRON OS&Y GATE VALVES

- A. UL 262 and FM (AG) standard listing for fire-service water control valves (OS&Y and NRS-type gate valves).
- B. AWWA C508 compliant gate valves.
- C. Minimum Pressure Rating: 175 psig.
- D. Body and Bonnet Material: Cast or ductile iron.
- E. Wedge: Cast or ductile iron, or bronze with elastomeric coating.
- F. Stem: Brass or bronze.
- G. Packing: Non-asbestos PTFE.
- H. Supervisory Switch: External.

2.4 TRIM AND DRAIN VALVES

- A. Ball Valves:
 - 1. Description:
 - a. Pressure Rating: 175 psig.
 - b. Body Design: Two piece.
 - c. Body Material: Forged brass or bronze.
 - d. Port Size: Full or standard.
 - e. Seat: PTFE.
 - f. Stem: Bronze or stainless steel.
 - g. Ball: Chrome-plated brass.
 - h. Actuator: Hand-lever.
 - i. End Connections for Valves 1 NPS through 2-1/2 NPS: Threaded ends.
 - j. End Connections for Valves 1-1/4 NPS and 2-1/2 NPS: Grooved ends.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Confirm valve interior to be free of foreign matter and corrosion.
- B. Remove packing materials.

16128.00

GENERAL-DUTY VALVES FOR
WATER-BASED FIRE-
SUPPRESSION PIPING

210523 - 4

- C. Examine guides and seats by operating valves from the fully open position to the fully closed position.
- D. Examine valve threads and mating pipe for form and cleanliness.

3.2 INSTALLATION

- A. Comply with specific valve installation requirements and application in the following Sections:
 - 1. Section 211300 for application of valves in wet and dry pipe, fire-suppression sprinkler systems.
- B. Install listed fire protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections.
- C. Valves in horizontal piping installed with stem at or above the pipe center.
- D. Position valves to allow full stem movement.
- E. Install valve tags. Comply with Section 210553 requirements for valve tags, schedules, and signs on surfaces concealing valves; and the appropriate NFPA standard applying to the piping system in which valves are installed.

END OF SECTION

SECTION 210553
IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

1.2 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation instructions.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Manufacturers:
 - 1. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 2. Kolbi Pipe Marker Company; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products, a Tricor Direct Company; [_____]: www.seton.com/#sle.
- B. Description: Laminated three-layer plastic with engraved letters.

2.2 TAGS

- A. Manufacturers:
 - 1. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 2. Kolbi Pipe Marker Company; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products, a Tricor Direct Company; [_____]: www.seton.com/#sle.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.3 PIPE MARKERS

- A. Manufacturers:
 - 1. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 2. Kolbi Pipe Marker Company; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products, a Tricor Company; [_____]: www.seton.com/#sle.
- B. Color: Comply with ASME A13.1.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

IDENTIFICATION FOR FIRE
SUPPRESSION PIPING AND
EQUIPMENT**3.2 INSTALLATION**

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- C. Use tags on piping 3/4 inch diameter and smaller.
 - 1. Install in clear view and align with axis of piping.
 - 2. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 211300
FIRE-SUPPRESSION SPRINKLER SYSTEMS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Wet-pipe sprinkler system.
- B. Dry-pipe sprinkler system.
- C. System design, installation, and certification.

1.2 RELATED REQUIREMENTS

- A. Section 210500 - Common Work Results for Fire Suppression: Pipe and fittings.
- B. Section 210523 - General-Duty Valves for Water-Based Fire-Suppression Piping.
- C. Section 210553 - Identification for Fire Suppression Piping and Equipment.

1.3 REFERENCE STANDARDS

- A. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.
- B. NFPA 13 - Standard for the Installation of Sprinkler Systems Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL (DIR) - Online Certifications Directory Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Shop Drawings:
 - 1. Submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
 - 2. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components, and accessories. Indicate system controls.
 - 3. Submit shop drawings, product data, and hydraulic calculations to Authorities Having Jurisdiction for approval. Submit proof of approval to Architect.
- D. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements for additional provisions.
 - 2. Extra Sprinklers: Type and size matching those installed in quantity required by referenced NFPA design and installation standard.

3. Sprinkler Wrenches: For each sprinkler type.

I. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

1.6 QUALITY ASSURANCE

- A. Maintain one copy of referenced design and installation standard on site.
- B. Comply with FM (AG) requirements.
- C. Designer Qualifications: Design system under direct supervision of a Professional experienced in design of this type of work and licensed in the State in which the Project is located.
- D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- E. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience and approved by manufacturer.
- F. Equipment and Components: Provide products that bear FM (AG) label or marking.
- G. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Sprinklers, Valves, and Equipment:
 - 1. Anvil International; [_____]: www.anvilintl.com/#sle.
 - 2. Tyco Fire Protection Products; [_____]: www.tyco-fire.com/#sle.
 - 3. Viking Corporation; [_____]: www.vikinggroupinc.com/#sle.
 - 4. Reliable.
 - 5. Substitutions: See Section 016000 - Product Requirements.

2.2 SPRINKLER SYSTEM

- A. Sprinkler System: Provide coverage for building areas noted.
- B. Occupancy: Ordinary hazard, Group 1; comply with NFPA 13. See drawings for design criteria.
- C. Water Supply: Determine volume and pressure from water flow test data. Contractor to perform new flow test prior to submitting hydraulic calculations.
- D. Interface system with building fire and smoke alarm system.
- E. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve.
- F. Pipe Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
 - 1. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - 2. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 - 3. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

2.3 SPRINKLERS

- A. Dry Sprinklers: Concealed pendant type with matching push on escutcheon plate.
 - 1. Response Type: Quick.
 - 2. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

2.4 PIPING SPECIALTIES

- A. Test Connections:
 - 1. Inspector's Test Connection:
 - a. Route test connection to an janitor sink, accepting full flow without negative consequences.

2.5 AIR COMPRESSOR

- A. Compressor: Single-unit, electric motor driven, motor, motor starter, safety valves, check valves, air maintenance device incorporating electric pressure switch and unloader valve.

PART 3 EXECUTION**3.1 INSTALLATION**

- A. Install in accordance with referenced NFPA design and installation standard.
- B. Install equipment in accordance with manufacturer's instructions.
- C. Place pipe runs to minimize obstruction to other work.
- D. Place piping in concealed spaces above finished ceilings.
- E. Center sprinklers in two directions in ceiling tile and provide piping offsets as required.
- F. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- G. Flush entire piping system of foreign matter.
- H. Hydrostatically test entire system.
- I. Require test be witnessed by Fire Marshal.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Ensure required devices are installed and connected as required to fire alarm system.

3.3 SCHEDULES

- A. System Hazard Areas:
 - 1. Offices: Light Hazard.
 - 2. Warehouse, Mechanical, Storage rooms: Ordinary Hazard, Group 2.

END OF SECTION

**SECTION 220500
COMMON WORK RESULTS FOR PLUMBING****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
 2. Transition fittings.
 3. Dielectric fittings.
 4. Mechanical sleeve seals.
 5. Sleeves.
 6. Escutcheons.
 7. Grout.
 8. Equipment installation requirements common to equipment sections.
 9. Painting and finishing.
 10. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
1. ABS: Acrylonitrile-butadiene-styrene plastic.
 2. CPVC: Chlorinated polyvinyl chloride plastic.
 3. PE: Polyethylene plastic.
 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
1. Transition fittings.
 2. Dielectric fittings.
 3. Mechanical sleeve seals.
 4. Escutcheons.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 1 PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Solvent Cements for Joining Plastic Piping:
 1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
 2. Underground Piping NPS 1-1/2 (DN 40) and Smaller: Manufactured fitting or coupling.
 3. Underground Piping NPS 2 (DN 50) and Larger: AWWA C219, metal sleeve-type coupling.
 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 1. Manufacturers:
 - a. Eslon Thermoplastics.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 1. Manufacturers:
 - a. Thompson Plastics, Inc.
- D. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.

- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150-psig (1035-kPa) minimum working pressure as required to suit system pressures.
1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 3. Pressure Plates: Carbon steel. Include two for each sealing element.
 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 1. Finish: Polished chrome-plated and rough brass.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

PART 1 EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.

- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, stamped-steel type with concealed hinge and set screw.
 - g. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with set screw or spring clips.
 - h. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
 - i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- R. Verify final equipment locations for roughing-in.
- S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- H. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- I. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.8 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION

SECTION 220517
SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Pipe sleeves.
- B. Stack-Sleeve fittings.
- C. Sleeve-Seal Fittings
- D. Grout

1.3 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 099123 - Interior Painting: Preparation and painting of interior piping systems.
- C. Section 220523 - General-Duty Valves for Plumbing Piping.
- D. Section 220553 - Identification for Plumbing Piping and Equipment: Piping identification.
- E. Section 220719 - Plumbing Piping Insulation.

1.4 REFERENCE STANDARDS

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type) 2022.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified this section.
 - 1. Minimum three years experience.
 - 2. Approved by manufacturer.
- C. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

1.8 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS**2.1 PIPE SLEEVES**

- A. Manufacturers:
1. Flexicraft Industries.
 2. Smith, Jay R. Mfg. Co..
 3. Zurn Specification Drainage Operation; Zurn Plumbing Products Group..
 4. Presealed Systems.
 5. Substitutions: See Section 016000 - Product Requirements.
- B. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral water stop unless otherwise indicated.
- C. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.Pipe
- D. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- E. Passing Through Below Grade Exterior Walls:
1. Zinc coated or cast iron pipe.
 2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.
- F. Clearances:
1. Provide allowance for insulated piping.
 2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
 3. All Rated Openings: Caulked tight with fire stopping material complying with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

2.2 STACK-SLEEVE FITTINGS

- A. Manufacturered, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.
1. Underdeck Clamp: Clamping rings with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

- A. Manufacturered plastic, sleeve-type, water stop assemblies made for imbedding in concrete slab or wall. Unit has plastic or rubber water stop collar with center opening to match piping OD.

2.4 GROUT

- A. Standard: ASTM C 1107/C1107M Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characterictics: Non shrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28 day compressive strength.
- D. Packaging: Premix and factory packaged.

PART 3 EXECUTION**3.1 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

3.2 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.3 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.
- C. See Section 017419 - Construction Waste Management and Disposal for additional requirements.

END OF SECTION

This page intentionally left blank

SECTION 220523
GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Ball valves.
B. Check valves.

1.3 RELATED REQUIREMENTS

- A. Section 220553 - Identification for Plumbing Piping and Equipment.
B. Section 220719 - Plumbing Piping Insulation.
C. Section 221005 - Plumbing Piping.

1.4 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
D. NRS: Non-rising stem.
E. OS&Y: Outside screw and yoke.
F. PTFE: Polytetrafluoroethylene.
G. RS: Rising stem.

1.5 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).
B. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves 2017.
C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
D. ASME B31.9 - Building Services Piping 2020.
E. ASTM B61 - Standard Specification for Steam or Valve Bronze Castings 2015 (Reapproved 2021).
F. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.
G. AWWA C606 - Grooved and Shouldered Joints 2015.
H. MSS SP-67 - Butterfly Valves 2017, with Errata.
I. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service 2010a.
J. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves 2019.
K. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .
L. NSF 61 - Drinking Water System Components - Health Effects 2020.
M. NSF 372 - Drinking Water System Components - Lead Content 2020.

1.6 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Obtain valves for each valve type from single manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
 - 2. Protect valve parts exposed to piped medium against rust and corrosion.
 - 3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
 - 4. Adjust globe, gate, and angle valves to the closed position to avoid clattering.
 - 5. Secure check valves in either the closed position or open position.
 - 6. Adjust butterfly valves to closed or partially closed position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection and protect flanges and specialties from dirt.
 - a. Provide temporary inlet and outlet caps.
 - b. Maintain caps in place until installation.
 - 2. Store valves in shipping containers and maintain in place until installation.
 - a. Store valves indoors in dry environment.
 - b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

1.9 EXERCISE THE FOLLOWING PRECAUTIONS FOR HANDLING:

- A. Handle large valves with sling, modified to avoid damage to exposed parts.
- B. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Conbraco Industries Inc.; Apollo Valves.
 - 2. Crane Co.; Crane Valve Group; Crane Valves.
 - 3. Hammond Valve
 - 4. Milwaukee Valve Company
 - 5. NIBCO INC.
 - 6. Red-White Valve Corporation
 - 7. Watts Regulator Co.; a division of Watts Water Technologies. Inc.

2.2 APPLICATIONS

- A. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- B. Provide the following valves for the applications if not indicated on drawings:
 - 1. Shutoff: Ball, butterfly, [_____].
 - 2. Dead-End: Single-flange butterfly (lug) type.
 - 3. Throttling: Provide ball.
 - 4. Swing Check (Pump Outlet):
 - a. 2 inch and Smaller: Bronze swing check valves with bronze or nonmetallic disc.

- C. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.
- D. Required Valve End Connections for Non-Wafer Types:
 - 1. Copper Tube:
 - a. 2 inch and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
- E. Domestic, Hot and Cold Water Valves:
 - 1. 2 inch and Smaller:
 - a. Ball: Two piece, full port, brass with brass trim.
 - b. Bronze Swing Check: Class 125, bronze disc.

2.3 GENERAL REQUIREMENTS

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
- D. Insulated Piping Valves: With 2 inch stem extensions and the following features:
 - 1. Gate Valves: Rising stem.
 - 2. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- E. Valve-End Connections:
 - 1. Threaded End Valves: ASME B1.20.1.
 - 2. Solder Joint Connections: ASME B16.18.
 - 3. Grooved End Connections: AWWA C606.
- F. General ASME Compliance:
 - 1. Solder-joint Connections: ASME B16.18.
 - 2. Building Services Piping Valves: ASME B31.9.
- G. Potable Water Use:
 - 1. Certified: Approved for use in compliance with NSF 61 and NSF 372.
 - 2. Lead-Free Certified: Wetted surface material includes less than 0.25 percent lead content.
- H. Source Limitations: Obtain each valve type from a single manufacturer.

2.4 BRONZE, BALL VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Two Piece, Full Port with Stainless Steel Trim:
 - 1. Comply with MSS SP-110.
 - 2. WSP Rating: 150 psi.
 - 3. WOG Rating: 600 psi.
 - 4. Body: Forged bronze or dezincified-brass alloy.
 - 5. Ends Connections: Pipe thread or solder.
 - 6. Seats: PTFE.
 - 7. Stem: Stainless steel, blowout proof.
 - 8. Ball: Stainless steel, vented.
 - 9. Manufacturers:
 - a. Apollo Valves; [_____]: www.apollovalves.com/#sle.

- b. Watts
- c. Nibco - Equal to 585HP-66-LF
- d. Viega LLC; [____]: www.viega.us/#sle.

2.5 BRONZE, LIFT CHECK VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Class 125:
 - 1. Comply with MSS SP-80, Type 1, Metal Disc to Metal Seat and Type 2, Nonmetallic Disc to Metal Seat.
 - 2. CWP Rating: 200 psi.
 - 3. Design: Vertical flow.
 - 4. Body: Comply with ASTM B61 or ASTM B62, bronze.
 - 5. End Connections: Threaded.
 - 6. Disc (Type 1): Bronze.

2.6 BRASS, HORIZONTAL SWING CHECK VALVES

- A. Class 125, Threaded or Soldered End Connections:
 - 1. WOG Rating: 200 psi.
 - 2. Body: Forged brass.
 - 3. Disc: Forged brass.
 - 4. Hinge-Pin, Screw, and Cap: Forged brass.

2.7 BRONZE, SWING CHECK VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Class 125:
 - 1. Pressure and Temperature Rating: MSS SP-80, Type 3.
 - 2. Design: Y-pattern, horizontal or vertical flow.
 - 3. WOG Rating: 200 psi.
 - 4. Body: Bronze, ASTM B62.
 - 5. End Connections: Threaded.
 - 6. Disc: Bronze.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

3.2 INSTALLATION

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Where valve support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.
- D. Install check valves where necessary to maintain direction of flow as follows:
 - 1. Lift Check: Install with stem plumb and vertical.
 - 2. Swing Check: Install horizontal maintaining hinge pin level.
 - 3. Orient plate-type into horizontal or vertical position, between flanges.

END OF SECTION

This page intentionally left blank

SECTION 220529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Support and attachment components for equipment, piping, and other plumbing work.

1.3 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
B. Section 055000 - Metal Fabrications : Materials and requirements for fabricated metal supports.

1.4 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
E. MFMA-4 - Metal Framing Standards Publication 2004.
F. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.6 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of the Valve and Fitting Industry Inc.

1.7 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ACSE/SEI7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, systems contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.8 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.9 QUALITY ASSURANCE

- A. Comply with applicable building code.

PART 2 PRODUCTS**2.1 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of [_____]. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Metal Channel (Strut) Framing Systems:
 - 1. Comply with MFMA-4.
- C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- D. Thermal Insulated Pipe Supports:
 - 1. General Construction and Requirements:
 - a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

16128.00

HANGERS AND SUPPORTS FOR
PLUMBING PIPING AND
EQUIPMENT

220529 - 3

- b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
 - c. Pipe supports to be provided for nominally sized, 1/2 inch to 30 inch iron pipes.
 - d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by a 360 degree, PVC jacketing.
2. PVC Jacket:
- E. Pipe Supports:
1. Liquid Temperatures Up To 122 degrees F:
 - a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
 - b. Support From Below: MSS SP-58 Types 35 through 38.
- F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
 3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 4. Hollow Masonry: Use toggle bolts.
 5. Hollow Stud Walls: Use toggle bolts.
 6. Wood: Use wood screws.
 7. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Comply with MFMA-4.
 - b. Channel Material: Use galvanized steel.
 - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- G. Equipment Support and Attachment:
 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

16128.00

HANGERS AND SUPPORTS FOR
PLUMBING PIPING AND
EQUIPMENT

220529 - 4

3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.
- 3.3 FIELD QUALITY CONTROL**
- A. See Section 014000 - Quality Requirements, for additional requirements.
 - B. Inspect support and attachment components for damage and defects.
 - C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
 - D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

**SECTION 220553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe markers.

1.3 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Identification painting.

1.4 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Piping: Tags.
- B. Pumps: Nameplates.

2.2 NAMEPLATES

- A. Manufacturers:
 - 1. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 2. Kolbi Pipe Marker Co; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products; [_____]: www.seton.com/#sle.
- B. Description: Laminated three-layer plastic with engraved letters.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/4 inch.
 - 3. Background Color: Black.
 - 4. Plastic: Comply with ASTM D709.

2.3 TAGS

- A. Manufacturers:
 - 1. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 2. Kolbi Pipe Marker Co; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products; [_____]: www.seton.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.

- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 STENCILS

- A. Manufacturers:
 - 1. Brady Corporation; [_____]: www.bradycorp.com/#sle.
 - 2. Kolbi Pipe Marker Co.; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products; [_____]: www.seton.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Stencils: With clean cut symbols and letters of following size:
 - 1. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
- C. Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.

2.5 PIPE MARKERS

- A. Manufacturers:
 - 1. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 2. Kolbi Pipe Marker Co; [_____]: www.kolbipipemarkers.com/#sle.
 - 3. Seton Identification Products; [_____]: www.seton.com/#sle.
- B. Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- D. Color code as follows:
 - 1. Domestic Water, Storm Drainage, Waste & Vent: Green with white letters.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

3.2 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Apply stencil painting in accordance with Section 099123.
- D. Install plastic pipe markers in accordance with manufacturer's instructions.
- E. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- F. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- G. Use tags on piping 3/4 inch diameter and smaller.
- H. Install labels and/or tags on all pipes as follows:

16128.00

IDENTIFICATION FOR
PLUMBING PIPING AND
EQUIPMENT

220553 - 3

1. Identify service, flow direction, and pressure.
2. Install in clear view and align with axis of piping.
3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

This page intentionally left blank

**SECTION 220719
PLUMBING PIPING INSULATION**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Jackets and accessories.
- D. Supplies and drains for hand
- E. Section includes insulating the following pipe systems
 - 1. Domestic Cold Water Piping
 - 2. Domestic Hot Water Piping
 - 3. Domestic recirculating hot water piping

1.2 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Painting insulation jacket.
- B. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.3 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2019).
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2020a.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.
- E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation 2022.
- F. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing 2010 (Reapproved 2016).
- G. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).
- H. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics 2019.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- J. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2021.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.
- B. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.
- C. Maintain ambient conditions required by manufacturers of each product.
- D. Maintain temperature before, during, and after installation for minimum of 24 hours.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER

- A. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
 - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 650 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.

2.3 CELLULAR GLASS

- A. Insulation: ASTM C552, Type II, Grade 6.
 - 1. K Value: 0.35 at 100 degrees F.
 - 2. Service Temperature Range: From 250 degrees F to 800 degrees F.
 - 3. Water Vapor Permeability: 0.005 perm inch maximum per inch.
 - 4. Water Absorption: 0.5 percent by volume, maximum.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 220 degrees F.
 - 3. Connection: Waterproof vapor barrier adhesive.
- B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.5 JACKETS

- A. PVC Plastic.
 - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F.
 - b. Maximum Service Temperature: 150 degrees F.
 - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil.
 - e. Connections: Brush on welding adhesive.
- B. ABS Plastic:

1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: Minus 40 degrees F.
 - b. Maximum Service Temperature: 180 degrees F.
 - c. Moisture Vapor Permeability: 0.012 perm inch, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 30 mil.
 - e. Connections: Brush on welding adhesive.
- C. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Install cellular melamine with factory-applied jackets with a manufacturer-approved adhesive along seams, both straight lap joints and circumferential lap joints.
 1. Install seal over seams with factory-approved room temperature vulcanization (RTV) silicone sealant to ensure a positive vapor barrier seal in outdoor and sanitary washdown environments.
- F. Glass fiber insulated pipes conveying fluids below ambient temperature:
 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- G. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- H. Inserts and Shields:
 1. Application: Piping 1-1/2 inches diameter or larger.
 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 3. Insert Location: Between support shield and piping and under the finish jacket.
 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

3.3 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch Insert dimension thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
2. NPS 1-1/4 and Larger: Insulation shall be one of the following:

- a. Flexible Elastomeric: 1 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water (105-140 F):**
- 1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.
 - 2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.
- C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:**
- 1. All Pipe Sizes: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
- 3.4 INDOOR, FIELD-APPLIED JACKET SCHEDULE**
- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
 - B. If more than one material is listed, selection from materials listed is Contractor's option.
 - C. Piping, Concealed:
 - D. Piping, Exposed:
 - 1. PVC: 20 mils thick.

END OF SECTION

**SECTION 221005
PLUMBING PIPING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary waste piping, buried within 5 feet of building.
- B. Domestic water piping, buried within 5 feet of building.
- C. Domestic water piping, above grade.

1.2 RELATED REQUIREMENTS

- A. Section 083100 - Access Doors and Panels.
- B. Section 099113 - Exterior Painting.
- C. Section 220529 - Hangers and Supports for Plumbing Piping and Equipment.
- D. Section 220553 - Identification for Plumbing Piping and Equipment.
- E. Section 312316 - Excavation.
- F. Section 312323 - Fill.

1.3 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- C. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings: DWV 2021.
- D. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings - DWV 2017.
- E. ASME B31.9 - Building Services Piping 2020.
- F. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings 2021.
- G. ASTM B32 - Standard Specification for Solder Metal 2020.
- H. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes 2020.
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
- K. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV) 2020.
- L. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.
- M. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.
- N. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings 2020a.
- O. AWWA C651 - Disinfecting Water Mains 2014, with Addendum (2020).
- P. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2018.
- Q. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2018.
- R. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- S. NSF 61 - Drinking Water System Components - Health Effects 2020.

T. NSF 372 - Drinking Water System Components - Lead Content 2020.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Cast Iron Pipe: ASTM A74 extra heavy weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

2.3 SANITARY SEWER AND SANITARY VENT PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- B. Copper Tube: ASTM B306, DWV.
 - 1. Fittings: ASME B16.29, wrought copper, or ASME B16.23, solvent.
 - 2. Joints: ASTM B32, alloy Sn50 solder.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Copper Pipe: ASTM B42, hard drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.

2.6 PIPE HANGERS AND SUPPORTS

- A. See Section 220529 for additional requirements.
- B. Provide hangers and supports that comply with MSS SP-58.
 - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.

3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.
- C. Plumbing Piping - Drain, Waste, and Vent:
 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
 4. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.
 5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- D. Plumbing Piping - Water:
 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 2. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 3. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
 4. Wall Support for Pipe Sizes Up to 3 inch: Cast iron hook.
 5. Floor Support for Hot Pipe Sizes to 4 inch: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
 6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- E. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
 1. Concrete Wedge Expansion Anchors: Comply with ICC-ES AC193.
 2. Masonry Wedge Expansion Anchors: Comply with ICC-ES AC01.

2.7 FLOW-BALANCING VALVES

- A. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.
- B. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. See Section 220516.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- G. Provide access where valves and fittings are not exposed.
 1. Coordinate size and location of access doors with Section 083100.
- H. Establish elevations of buried piping outside the building to ensure not less than 5 ft of cover for pipes that require freeze protection.

- I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly; see Section [_____].
- J. Prepare exposed, unfinished pipe, fittings, supports, and accessories for finish painting.
 - 1. See Section 099113 for painting of exterior plumbing systems and components.
- K. Excavate in accordance with Section 312316.
- L. Backfill in accordance with Section 312323.
- M. Install valves with stems upright or horizontal, not inverted. See Section 220523.
- N. Install water piping to ASME B31.9.
- O. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- P. Sleeve pipes passing through partitions, walls, and floors.
- Q. Pipe Hangers and Supports:
 - 1. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- R. Pipe Sleeve-Seal Systems:
 - 1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
 - 2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
 - 3. Locate piping in center of sleeve or penetration.
 - 4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
 - 5. Tighten bolting for a watertight seal.
 - 6. Install in accordance with manufacturer's recommendations.

3.4 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. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- D. Provide spring-loaded check valves on discharge of water pumps.

3.5 FIELD TESTS AND INSPECTIONS

- A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.
- B. Domestic Water Systems:
 - 1. Perform hydrostatic testing for leakage prior to system disinfection.
 - 2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
 - 3. General:
 - a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.
- C. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed, and clean.

- B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION

This page intentionally left blank

**SECTION 221006
PLUMBING PIPING SPECIALTIES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Roof Drains.
- B. Cleanouts.
- C. Floor Drains
- D. Miscellaneous Sewer Drainage Specialties
- E. Miscellaneous Storm Drainage Specialties
- F. Water meters.
- G. Backflow preventers.
- H. Double check valve assemblies.
- I. Water hammer arrestors.
- J. Vacuum Breakers
- K. Hose Bibbs
- L. Escutcheons
- M. Floor Plates

1.3 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Manhole bottoms.
- B. Section 221005 - Plumbing Piping.
- C. Section 223000 - Plumbing Equipment.
- D. Section 224000 - Plumbing Fixtures.

1.4 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASME A112.6.3 - Floor and Trench Drains 2019.
- C. ASME A112.6.4 - Roof, Deck, and Balcony Drains 2003 (Reaffirmed 2012).
- D. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers 2017.
- E. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies 2021.
- F. ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance 2011 (Reaffirmed 2016).
- G. NSF 61 - Drinking Water System Components - Health Effects 2020.
- H. NSF 372 - Drinking Water System Components - Lead Content 2020.
- I. PDI-WH 201 - Water Hammer Arresters 2017.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

- C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- D. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- E. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- F. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, and water hammer arrestors.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 ESCUTCHEONS

- A. One-piece, Cast-brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-piece, Deep-Pattern Type: Deep-drawn, box-shaped with chrome-plated finish and spring-clip fasteners.
- C. One-piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
- D. Split-Casting Brass Type: With polished, chrome-plated finish and with the concealed hinge and setscrew.

2.3 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- B. Split-Casting Floor Plates: Castbrass with concealed hinge.

2.4 FLOOR DRAINS (FD-1)

- A. Manufacturers: Subject to compliance with requirements, available manufacturers product offering that may be incorporated into the work include, but are not limited to, the following:
 - 1. Jay R. Smith Manufacturing Company; [____]: www.jrsmith.com/#sle.
 - 2. MIFAB, Inc; [____]: www.mifab.com/#sle.
 - 3. Watts Equal to **FD-100-A**
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable stainless steel strainer.

2.5 CLEANOUTS (FCO & WCO)

- A. Manufacturers: Subject to compliance with requirements, available manufacturers product offering that may be incorporated into the work include, but are not limited to, the following:
- B. Cleanouts at Interior Finished Floor Areas (**FCO**):
 - 1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
- C. Cleanouts at Interior Finished Wall Areas (**WCO**):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
- D. Cleanouts at Interior Unfinished Accessible Areas (CO): Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.6 WATER HAMMER ARRESTORS (HA-1)

- A. Manufacturers: Subject to compliance with requirements, available manufacturers product offering that maybe incorporated into the work include, but are not limited to, the following:
 1. Jay R. Smith Manufacturing Company; [____]: www.jayrsmith.com/#sle.
 2. Watts Regulator Company, a part of Watts Water Technologies; [____]: www.wattsregulator.com/#sle. **Equal to LF15M2-DR**
 3. Zurn Industries, LLC; [____]: www.zurn.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. Water Hammer Arrestors:
 1. Stainless steel construction, piston type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.

2.7 2.03 MISCELLANOUS STORM DRAIANGE PIPING SPECIALTIES

- A. TROUGH-PENETRATION FIRE STOP ASSEMBLIES

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install escutcheons for piping penetration of walls, ceilings, and finished floors.
- C. Install escutcheons with ID to closely fit around the pipe, tube, and insulation and with OD that completely covers the opening.
 1. Escutcheons for New Piping:
 - a. Piping with Fittings or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plating Piping: One-piece, cast-brass type with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass, cast-brass type with polished, chrome-plated finish.
 - g. Bare Piping in Equipment Rooms: One-piece, cast-brass type with polished, chrome-plated finish.
 2. Escutcheons for Existing Pipe:
 - a. Chrome-Plated Piping: Split-casting brass type with polished, chrome-plated finish.
 - b. Insulated Piping: Split-plate, stamped-steel type with concealed or exposed-rivet hinge.
 - c. Bare Piping at Wall or Floor Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting brass type with polished chrome-plate finish.
 - e. Bare Piping in Unfinished Service Spaces: Split-casting brass type with polished, chrome-plated finish.
 - f. Bare Piping in Equipment Rooms: Split-casting brass type with polished, chrome-plated finish.

- D. Install floor plates for piping penetrations of equipment-room floors.
- E. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping with OD that completely covers opening.
 - 1. New Piping: One-piece, floor plate type.
 - 2. Existing Piping: Split-casting, floor-plate type.
- F. 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.
- G. Encase exterior cleanouts in concrete flush with grade.
- H. Install floor cleanouts at elevation to accommodate finished floor.
- I. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks or Sinks.

END OF SECTION

**SECTION 224000
PLUMBING FIXTURES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water closets.
- B. Lavatories.
- C. Sinks.
- D. Under-lavatory pipe supply covers.

1.2 RELATED REQUIREMENTS

- A. Section 064100 - Architectural Wood Casework: Preparation of counters for sinks and lavatories.
- B. Section 079200 - Joint Sealants: Sealing joints between fixtures and walls and floors.
- C. Section 221005 - Plumbing Piping.
- D. Section 221006 - Plumbing Piping Specialties.
- E. Section 223000 - Plumbing Equipment.
- F. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use 1997 (Reaffirmed 2017).
- C. ASME A112.18.1 - Plumbing Supply Fittings 2018, with Errata.
- D. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures 2011 (Reaffirmed 2017).
- E. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures 2018.
- F. ASME A112.19.2 - Ceramic Plumbing Fixtures 2018, with Errata.
- G. ASME A112.19.3 - Stainless Steel Plumbing Fixtures 2017, with Errata.
- H. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures 1994 (Reaffirmed 2009).
- I. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks 2017.
- J. ASME A112.19.15 - Bathtubs/Whirlpool Bathtubs with Pressure Sealed Doors 2012 (Reaffirmed 2017).
- K. ASSE 1014 - Performance Requirements for Backflow Prevention Devices for Hand-Held Showers 2005.
- L. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices 2020.
- M. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping 2021.
- N. NSF 61 - Drinking Water System Components - Health Effects 2020.
- O. NSF 372 - Drinking Water System Components - Lead Content 2020.
- P. UL (DIR) - Online Certifications Directory Current Edition.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Manufacturer's Instructions: Indicate installation methods and procedures.
- D. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.
- E. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.7 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

2.2 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.
- B. Comply with UL (DIR) requirements.
- C. Perform work in accordance with local health department regulations.
- D. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation.

2.3 PLUMBING FIXTURES

- A. See Plumbing Plans for Plumbing Fixture Schedule
 - 1. Provide Plumbing Fixtures and all accessories as indicated on the plumbing fixture schedule on the drawings. Acceptable manufacturer are indicated below.
 - a. American Standard, Inc; [_____]: www.americanstandard-us.com/#sle.
 - b. Delany Products; [_____]: www.delanyproducts.com/#sle.
 - c. DXV by American Standard, Inc; [_____]: www.dxv.com/#sle.
 - d. Sloan Valve Company; [_____]: www.sloanvalve.com/#sle.
 - e. Kohler Company; [_____]: www.kohler.com/#sle.
 - f. Viega LLC; [_____]: www.viega.us/#sle.
 - g. Zurn Industries, Inc; [_____]: www.zurn.com/#sle.
 - h. [_____].
 - i. Substitutions: See Section 016000 - Product Requirements.

2.4 FLUSH VALVE WATER CLOSETS (WC-1)

- A. Water Closets: Vitreous china, ASME A112.19.2, wall hung, siphon jet flush action.
 - 1. Bowl: ASME A112.19.2; 16.5 inches high with elongated rim.
 - 2. Flush Valve: Exposed (top spud).
 - 3. Flush Operation: Manual, oscillating handle.
 - 4. Handle Height: 44 inches or less.
 - 5. Outlet Size: 3 inches.
 - 6. Color: White.
- B. Basis of Design [_____]
- C. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
 - 1. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
- D. See Plumbing Schedule for Model Information
- E. Seats:
 - 1. Solid white plastic, open front, extended back, self-sustaining hinge, brass bolts, without cover.
- F. See Plumbing Schedule for Model Information
- G. Water Closet Carriers:
 - 1. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.5 LAVATORIES (LAV-1)

- A. Lavatory Manufacturers:
 - 1. American Standard, Inc; [_____]: www.americanstandard-us.com/#sle.
 - 2. Gerber Plumbing Fixtures LLC; [_____]: www.gerberonline.com/#sle.
 - 3. Kohler Company; [_____]: www.kohler.com/#sle.
- B. Vitreous China Wall Hung Basin: ASME A112.19.2; vitreous china wall hung lavatory, 20 inch by 18 inch minimum, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.
 - 1. Drilling Centers: 4 inch.
- C. See Plumbing Schedule for Model Information
- D. Supply Faucet: ASME A112.18.1; chrome plated supply fitting with open grid strainer, water economy aerator with maximum flow of 0.5 gallon per minute (low-flow), single push button metered faucet with temperature adjustment.
- E. Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with combination stop, strainer, and check valves, and flexible stainless steel connectors.
- F. See Plumbing Schedule for Model Information
- G. Accessories:
 - 1. Chrome plated 17 gauge, 0.0538 inch brass P-trap with clean-out plug and arm with escutcheon.
 - 2. Carrier:
 - a. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.

2.6 SINKS (S-1)

- A. See Plumbing Schedule for Model Information
- B. Single Compartment Bowl: ; 19.5 by 22 by 10.5 inch outside dimensions 20 gauge, 0.0359 inch thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.

1. Drain: 1-1/2 inch chromed brass drain.
 2. Drain: 3-1/2 inch crumb cup and tailpiece.
- C. Faucet: ASME A112.18.1; chrome plated combination supply fitting with open grid strainer, water economy aerator with maximum flow of 2.2 gallons per minute, indexed handles.
- D. Trap: Grid strainer plaster trap with removable basket in waste piping under cabinet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall supports and bolts.
- E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

- A. Clean plumbing fixtures and equipment.
- B. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

3.7 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 230000
GENERAL PROVISIONS FOR MECHANICAL WORK**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Requirements of this Section apply to work in every Section of Division 23 equally as if incorporated therein.

1.2 WORK INCLUDED

- A. Work included in Division 23 - Mechanical: Materials, equipment, fabrication, installation, and tests in conformity with applicable codes and authorities having jurisdiction for Mechanical Work covered by all sections within this Division.

1.3 SCOPE

- A. Division of the Specification into sections is for the purpose of simplification alone. Responsibility for the work of various trades shall rest with the Contractor. Various sections of this Division are related to each other as well as the mechanical drawings. Examine all drawings and read all applicable parts of the project manual in order to ensure complete execution of all work in this Division, coordinating where required with other trades in order to avoid conflicts.
- B. These specifications and accompanying drawings are intended to cover the furnishing of all labor, materials, equipment and services necessary for the complete installation and acceptable performance of the mechanical systems. Small items of material, equipment and appurtenances not mentioned in detail or shown on the drawings, but necessary for complete and operating systems shall be provided by this contractor without additional charge to the Owner and shall be included under this contract.
- C. In general, specifications establish the quality of material, equipment and workmanship. The contract documents are intended to secure for the Owner, a first-class installation in every respect. Labor shall be performed by skilled mechanics, and the entire facility, when delivered to the Owner, shall be ready for satisfactory and efficient operation.
- D. The Contractor shall carefully examine the drawings and specifications before accepting the contract. He shall call attention to any changes or additions which, in his opinion, are necessary to make possible the fulfillment of any guarantee called for by these specifications; failing which, it shall be deemed that he has accepted full responsibility for all such guarantees.
- E. The contractor shall put his work in place as fast as is reasonably possible. He shall, at all times, keep a competent foreman in charge of the work, to make decisions necessary for the diligent advancement of the work. The Contractor shall facilitate the inspection of the work by the Owner's Representative.
- F. The Contractor shall coordinate all work in the building in order to facilitate intelligent execution of the work. He shall also remove any rubbish as expeditiously as possible.
- G. Materials or products specified herein and/or indicated on the drawings by trade's names, manufacturer's names, model number or catalog numbers establish the quality of materials or products to be furnished. Model numbers are to be confirmed by the manufacturer to provide required capacities and material to meet the specifications and design intent. In no instance shall an obsolete, incomplete or inaccurate trade name, manufacturer name, model number or catalog number indicated on the drawings, result in additional charges to the owner.
- H. Points of connection or continuation of work under this contract are so marked on drawings or herein specified. In case of any doubt as to the required exact location of such points, the Owner's

Representative shall decide and direct.

- I. The plumbing contractor shall provide water services to within two (2) feet of HVAC equipment requiring same, and shall terminate service with a shutoff valve. The mechanical contractor shall make the final connection to the equipment.

1.4 REFERENCE STANDARDS, CODES AND REGULATIONS

A. Requirements of Regulatory Agencies:

1. Nothing contained in these specifications or shown on the drawings shall be construed to conflict with any State or local laws, ordinances, rules and regulations, the UL and NFPA regulations. The Contractor shall make all changes required by the enforcing authorities. Where alterations to and / or deviations from the Contract Documents are required by the authorities having jurisdiction, report the requirements to the Engineer and secure acceptance before work is started. All such changes shall be made in a manner acceptable to the Engineer and shall be made without cost to the Owner.
2. When drawings or specifications exceed requirements of applicable laws, ordinances, rules and regulations, comply with documents establishing the more stringent requirement. All work shall be done in full conformity with the requirements of all authorities having jurisdiction. Installation shall be made in compliance with all applicable regulations, and utility company rules, all of which shall be considered a part of this specification and shall take precedence in the order of listing.
3. It is not the intent of drawings or specifications to repeat requirements of codes except where necessary for completeness in individual sections.

B. Published specifications, standards, tests or recommended method of trade, industry or governmental organizations as listed below apply to all work in this Division, in addition to other standards which may be specified in individual sections:

1. Associated Air Balance Council
2. Air Diffuser Balance Council
3. Air Moving and Conditioning Association
4. American Gas Association
5. American National Standards Institute
6. Air Conditioning and Refrigeration Institute
7. American Society of Heating, Refrigeration and Air Conditioning Engineers
8. American Society of Mechanical Engineers
9. American Society for Testing and Materials
10. Cast Iron Soil Pipe Institute
11. ETL Testing Laboratories
12. Factory Mutual Engineering and Research Corporation
13. National Standard Plumbing Code
14. National Electrical Manufacturer's Association
15. National Fire Protection Association
16. National Board of Fire Underwriters
17. National Electric Code
18. Occupational Safety and Health Administration
19. Plumbing Drainage Institute
20. Sheet Metal & Air Conditioning Contractors National Association
21. Underwriters Laboratories, Inc.

- C. Furnish and file with the proper authorities, all drawings required by them in connection with the work. Contractor shall secure and obtain all approvals, permits, licenses and inspections and pay all legal and proper fees and charges in this connection, before commencing work in order to avoid

delays during construction. He shall deliver the official records of the granting of the permits, etc., to the Owner's Representative.

1.5 QUALITY ASSURANCE

- A. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.
- B. Supply all equipment and accessories new and free from defects.
- C. Supply all equipment and accessories in compliance with the applicable standards listed in Article 1.4 of this section with all applicable national, state and local codes.
- D. All items of a given type shall be the product of same manufacturer.

1.6 DESCRIPTION OF BID DOCUMENTS

- A. Specifications:
 - 1. Specifications, in general, describe quality and character of materials and equipment.
 - 2. Specifications are of simplified form and include incomplete sentences.
 - 3. Words or phrases such as "The Contractor shall", "shall be", "furnish", "provide", "a", "an", "the", and "all" may have been omitted for brevity.
- B. Drawings: Mechanical drawings under this contract are made a part of these specifications. Deviations from these specifications as noted below must have the approval of the Engineer or Construction Manager without an increase in contract price.
 - 1. The drawings shall be considered as being diagrammatic and for bidding purposes only. Intention is to show size, capacity, approximate location, direction and general relationship of one work phase to another, but not exact detail or arrangement. The attention of the contractor is called to the fact that while these drawings are generally to scale and are made as accurately as the scale will permit, all critical dimensions shall be determined in the field. They are not to be considered as erection drawings.
 - 2. The drawings do not indicate every fitting, elbow, offset, valve, etc. which is required to complete the job. Contractor shall prepare field erection drawings as required for the use of his mechanics to insure proper installation.
 - 3. Scaled and figured dimensions are approximate and are for estimating purposes only. Indicated dimensions are limiting dimensions.
 - 4. Before proceeding with work check and verify all dimensions in field.
 - 5. Assume all responsibility for fitting of materials and equipment to other parts of equipment and structure.
 - 6. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
 - 7. For exact locations of building elements, refer to dimensional Architectural/Structural drawings.
- C. Description of systems: Provide all materials to provide functioning systems in compliance with performance requirements specified, and any modifications resulting from reviewed shop drawings and field coordinated drawings.
 - 1. Installation of all systems and equipment is subject to clarification as indicated in reviewed shop drawings and field coordination drawings.
- D. Do not use equipment exceeding dimensions indicated or equipment or arrangements that reduce required clearances or exceed specified maximum dimensions.
- E. If any part of Specifications or Drawings appears unclear or contradictory, apply to Architect for his interpretation and decision as early as possible, including during bidding period.
 - 1. Do not proceed with work without Engineer's decision.

1.7 EQUIPMENT MANUFACTURERS

- A. The first named manufacturer is used as the basis of design. Other named manufacturers are identified as equivalent manufacturers, not equivalent products. Naming other manufacturers does not necessarily imply conformance of any specific product with the written specifications.
- B. The contractor is required to verify that equipment and material to be used on the project meets the requirements of the specifications and will physically fit the available space, clearance and service requirements of the particular piece of equipment and include all pertinent information when he submits material for acceptance. Contractor shall also be responsible for and bear the cost of any modifications to openings available or anticipated as being available for rigging equipment to its final installation place. This shall include openings in exterior envelope, walls and roofs, interior walls, corridors, passage ways or door openings. Any on site dismantling and any reassembly of equipment made necessary by impediment to the rigging of said equipment shall be the sole responsibility of the contractor.
- C. Contract document indicates power and physical requirements based on the equipment manufacturer's data as first named. If equipment requiring more system capacity is furnished, the contractor shall be responsible for the cost associated with modifying the design and installation of associated services, including any redesign costs associated with the engineer's review.

1.8 DEFINITIONS

- A. "Provide": To supply, furnish, install and connect up complete and ready safe and regular operation of particular work referred to unless specifically noted.
- B. "Install": To erect, mount and connect complete with related accessories.
- C. "Supply", "Furnish": To purchase, procure, acquire and deliver complete with related accessories.
- D. "Work": Labor, materials, equipment, apparatus, controls, accessories, and other items required for proper and complete installation.
- E. "Piping": Pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation, and related items.
- F. "Wiring": Raceway, fittings, wire, boxes and related items.
- G. "Concealed": Items referred to as hidden from normal sight, embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces, or in enclosures.
- H. "Exposed": Not installed underground or "concealed" as defined above.
- I. "Indicated", "Shown", or "Noted": As indicated, shown or noted on drawings or specifications.
- J. "Directed": Directed by Engineer.
- K. "Similar" or "Equal": Of base bid manufacture, equal in materials, weight, size, design, and efficiency of specified product.
- L. "Reviewed", "Satisfactory", or "Directed": As reviewed, satisfactory, or directed by or to Engineer.
- M. "Motor Controllers": Manual or magnetic starters (with or without switches), individual pushbuttons or hand-off-automatic (HOA) switches controlling the operation of motors.
- N. "Control or Actuating Devices": Automatic sensing and switching devices such as thermostats, pressure, float, electro-pneumatic switches and electrodes controlling operation of equipment.
- O. "Remove": Dismantle, demolish and take away from the site and dispose of in accordance with all applicable rules and regulations or, should the Owner so require, deliver to a location as designated by the Owner for the use of the Owner, at no additional costs to the Owner.
- P. "Replace": Remove existing and provide an equivalent product or material as specified.

- Q. "Extract (and Reinstall) ": Carefully disassemble, dismantle existing, save or store where directed by the Owner, in such a manner as to preserve the existing condition and reinstall as indicated on the drawings or as described in the specifications.
- R. Where any device or piece of equipment is referred to in the singular number, such reference shall be deemed to apply to as many devices as are required to complete the installation.

1.9 JOB CONDITIONS

- A. This contractor shall investigate all conditions affecting his work and shall provide such offsets, fittings, valves, sheet metal work, etc., as may be required to meet conditions at the building.
- B. The contractor shall verify all measurements at the building site and shall be responsible for the correctness of same before ordering materials or before starting work of any Section.
1. Report to Architect, in writing, conditions which will prevent proper provision of this work.
 2. Beginning work of any Section without reporting unsuitable conditions to Architect constitutes acceptance of conditions by Contractor.
 3. Perform any required removal, repair or replacement of this work caused by unsuitable conditions at no additional cost to Owner.
- C. Piping and ductwork shall be concealed or run behind furring in finished spaces unless otherwise noted to be run exposed.
- D. Horizontal piping and ductwork not run below slabs on grade shall be run as close as possible to underside of roof or floor slab above and parallel to building lines. Maintain maximum headroom in all areas.
- E. Determine possible interference between trades before the work is fabricated or installed. The contractor must coordinate his work to insure that erection will proceed without such interference. Coordination is of paramount importance and no request for additional payment will be considered where such request is based upon interference between trades.
- F. Connections to Existing Work:
1. Install new work and connect to existing work with minimum of interference to existing facilities.
 2. Temporary shutdowns of existing services:
 3. At no additional charges
 - a. At times not to interfere with normal operation of existing facilities.
 - b. Only with written consent of Owner.
 4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
 5. Restore existing disturbed work to original condition.
- G. Removal, extraction and relocation of existing work.
1. The work includes demolition or removal of all construction indicated or specified. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the Contractor and shall be removed from the site. Rubbish and debris shall be removed from the site daily unless otherwise directed so as to not allow accumulation inside or outside the building. Materials that cannot be removed daily shall be stored in areas specified by the Owner.
 2. Title to all materials and equipment to be demolished, excepting Owner salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The Owner will not be responsible for the condition, loss or damage to such property after notice to proceed.
 3. The Owner reserves the "Right of First Refusal" on all material for salvage. Material for salvage shall be stored as approved by the Owner. Salvage materials shall be removed from the site before completion of the Contract. Material for salvage shall not be sold on the site.

4. Property of the Owner: Salvaged items remaining the property of the Owner shall be removed in a manner to prevent damage and packed or crated to protect the items from damage while in storage or during shipment and relocated by the contractor at no cost, to the Owners designated storage facility on the site. Containers shall be properly identified as to contents.
5. Damaged Items: Items damaged during removal or storage shall be repaired or replaced to match existing.
6. Disconnect, remove or relocate material, equipment, plumbing fixtures, piping and other work noted and required by removal or changes in existing conditions.
7. Where existing pipes, conduits and/or ducts which are to remain prevent installation of new work as indicated, relocate, or arrange for relocation, of existing pipes, conduits, and/or ducts.
8. Provide new material and equipment required for relocated equipment.
9. Plug or cap active piping or ductwork behind or below finish.
10. Do not leave long dead-end branches.
 - a. Cap or plug as close as possible to active line.
11. Remove unused piping, ductwork and equipment.
12. Dispose of unusable piping, ductwork and material.

1.10 CLEARANCE FROM ELECTRICAL EQUIPMENT

- A. Piping or ductwork:
 1. Prohibited, except as noted, in:
 - a. Electric rooms and closets.
 - b. Telephone rooms and closets.
 - c. Elevator machine rooms.
 - d. Electric switchboard room.
 2. Prohibited, except as noted, over or within 5 ft. of:
 - a. Transformers.
 - b. Substations.
 - c. Switchboards.
 - d. Motor control centers.
 - e. Standby power plant.
 - f. Bus ducts.
 - g. Electrical panels.
 3. Drip pans under piping:
 - a. Only where unavoidable and approved.
 - b. 18 gauge galvanized steel.
 - 1) With bituminous paint coating.
 - c. Reinforced and supported.
 - d. Watertight.
 - e. With 1-1/4 inch drain outlet piped to floor drain or service sink.

1.11 TEMPORARY FACILITIES

- A. Temporary facilities are not included within this Section.

1.12 SPECIAL TOOLS

- A. Furnish to Owner at completion of work:
 1. One set of any special tools required to operate, adjust, dismantle or repair equipment furnished under any section of the Division.
 2. "Special tools": those not normally found in possession of mechanics or maintenance personnel.
 3. One pressure grease gun for each type of grease required.

- a. With adapters to fit all lubricating fittings on equipment.
- b. Include lubricant for lubricated plug valves.

1.13 PRODUCT DELIVERY, HANDING AND STORAGE

- A. Provide adequate and secure storage facilities for materials and equipment during the progress of the work.
- B. Contractor shall be responsible for the condition of all materials and equipment employed in the mechanical installation until final acceptance by the Owner. Protect same from any cause whatsoever.
- C. Where necessary, ship in crated sections of size to permit passing through available space.
- D. Ship equipment in original packages, to prevent damaging or entrance of foreign matter.
- E. Handle and ship in accordance with manufacturer's recommendations.
- F. Provide protective coverings during construction.
- G. Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by Engineer.
- H. Tag all items with weatherproof tag, identifying equipment by name and purchase order number.
- I. Include packing and shipping lists.
- J. Adhere to special requirements as specified in individual sections.

1.14 PROTECTION OF MATERIALS

- A. Protect from damage, water, dust, etc., material, equipment and apparatus provided under this Division, both in storage and installed, until Notice of Completion has been filed.
- B. Provide temporary storage facilities for materials and equipment.
- C. Material, equipment or apparatus damaged because of improper storage or protection will be rejected.
 1. Remove from site and provide new, duplicate, material, equipment, or apparatus in replacement of that rejected.
- D. Cover motors and other moving machinery to protect from dirt and water during construction. Rotate moving equipment, shafts, bearings, motors etc. to prevent corrosion and to circulate lubricants.
- E. Protect premises and work of other Divisions from damage arising out of installation of work of this Division.
 1. Contractor shall be responsible for the replacement of all damaged or defective work, materials or equipment. Do not install sensitive or delicate equipment until major construction work is completed.
 2. Remove replaced parts from premises.
- F. Make good any damage to the work caused by floods, storms, accidents, acts of God, acts of negligence, strikes, violence or theft up to time of final acceptance by the Owner.
- G. Do not leave any mechanical work in a hazardous condition, even temporarily.

1.15 REVIEW OF CONSTRUCTION

- A. Work may be reviewed at any time by representative of the Engineer.
- B. Advise Architect and Engineer that work is ready for review at following times:
 1. Prior to backfilling buried work.
 2. Prior to concealment of work in walls and above ceilings.
 3. When all requirements of Contract have been completed.

- C. Neither backfill nor conceal work without Engineer's consent.
- D. Maintain on job a set of Specifications and Drawings for use by Engineer's representatives.

1.16 SCHEDULE OF WORK

- A. Arrange work to conform to schedule of construction established or required to comply with Contract Documents.
- B. In scheduling, anticipate means of installing equipment through available openings in structure.
- C. Confirm in writing to Architect and Engineer, within 30 days of signing of contract, anticipated number of days required to perform test, balance, and acceptance testing of mechanical systems.
 - 1. This phase must occur after completion of mechanical systems, including all control calibration and adjustment, and requires substantial completion of the building, including closure, ceilings, lighting, partitioning, etc.
 - 2. Submit for approval at this time, names and qualifications of test and balancing agencies to be used.
- D. Arrange with Owner schedule for work in each area.
- E. Unless otherwise directed by Owner, perform work during normal working hours.
- F. Work delays:
 - 1. In case noisy work interferes with Owner's operations, Owner may require work to be stopped and performed at some other time, or after normal working hours.

1.17 ACCESS TO MECHANICAL WORK

- A. Access doors in walls and ceilings.
- B. Access Units Fire-Resistance Ratings: Where fire-resistance rating is indicated for construction penetrated by access units, provide UL listed-and-labeled units, except for units which are smaller than minimum size requiring ratings as recognized by governing authority.
- C. Product Data, Access Units: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.
- D. Furnish to the general contractor all access doors necessary for access through inaccessible wall or ceiling construction, for installation by the general contractor. Information on the size and location of the subject access doors is to be communicated in writing to the general contractors during the bidding period.

1.18 CONCRETE FOR MECHANICAL WORK

- A. Concrete for Mechanical Work
 - 1. Basins and curbs for mechanical equipment.
 - 2. Mechanical equipment foundations and housekeeping pads.
 - 3. Inertia bases for isolation of mechanical work.
 - 4. Rough grouting in and around mechanical work.
 - 5. Patching concrete cut to accommodate mechanical work.
- B. Quality control testing for concrete is required as work of this section.
- C. Concrete Work Codes and Standards:
 - 1. Comply with governing regulations and, where not otherwise indicated, comply with the following industry standards; whichever is the most stringent in its application to work in each instance.
 - a. ACI 301: "Specifications for Structural Concrete for Buildings"
 - b. ACI 311: "Recommended Practice for Concrete Inspection"

- c. ACI 318: "Building Code Requirements for Reinforced Concrete"
 - d. ACI 347R: "Recommended Practice for Concrete Form work"
 - e. ACI 304R: "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
 - f. Concrete Reinforcing Steel Institute's, "Manual of Standard Practice"
- D. Submittals: Shop Drawings, Mechanical Concrete Work: Submit shop drawings for structural type concrete work, showing dimensions of formed shapes of concrete; bending, placement, sizes and spacing of reinforcing steel; location of anchors, isolation units, hangers and similar devices to be integrated with concrete work; and piping penetrations, access openings, inlets and other accessories and work to be accommodated by concrete work.
- E. Laboratory Test Reports, Mechanical Concrete Work: Submit laboratory test reports for concrete work materials, and for tested samples of placed concrete (where required as work of this section).

1.19 NOISE REDUCTION

- A. Cooperate in reducing objectionable noise or vibration caused by mechanical systems.
 - 1. To extent of adjustments to specified and installed equipment and appurtenances.
- B. Correct noise problems caused by failure to install work in accordance with Contract Documents.
 - 1. Include labor and materials required as result of such failure.

1.20 CUTTING AND PATCHING

- A. Provide all carpentry, cutting and patching required for proper installation of material and equipment specified.
- B. Do not cut or drill structural members without consent of Architect.

1.21 COORDINATION DRAWINGS

- A. Layout Shop Drawings Required:
 - 1. Prepare layout shop drawings for all areas; minimum 3/8 inch scale.
 - 2. Individual coordinated trade layout drawings are to be prepared for all areas.
 - 3. General Contractor is to assure that each trade has coordinated work with other trades, prior to submittal where submittal is required.
 - a. Include stamp on each submittal indicating that layout shop drawing has been coordinated.
 - 4. No layout shop drawing will be reviewed without stamped and signed coordinated assurance by General Contractor.
 - 5. All changes shall be clearly marked on each submitted layout drawing.
 - 6. Drawings shall show work of all trades including but not limited to'
 - a. Ductwork.
 - b. Piping: All Trades.
 - c. Mechanical Equipment.
 - d. Electrical Equipment.
 - e. Main Electrical conduits and bus ducts.
 - f. Equipment supports and suspension devices.
 - g. Structural and architectural constraints.
 - h. Show location of:
 - 1) Valves
 - 2) Piping specialties
 - 3) Dampers
 - 4) Access Doors
 - 5) Control and electrical panels
 - 6) Disconnect switches

7. Drawings shall indicate coordination with work in other Divisions that must be incorporated in mechanical spaces, including, but not limited to:
 - a. Elevator equipment.
 - b. Cable trays not furnished under Division 16.
 - c. Computer equipment.
 8. Submission of drawings:
 - a. Prepare reproducible drawings.
 - b. Submit to other trades for review of space allocated to all trades.
 - c. Revise drawings to compensate for requirements of existing conditions and conditions created by other trades.
 - d. Review revisions and other trades.
 - e. Submit one reproducible and one blueline print to Engineer for review.
 9. Final prepared drawings shall show that other trades affected have made reviews and signed, by each trade, at completions of coordination.
 - a. General Contractor
 - b. Include stamp on each submittal indicating that layout shop drawing has been coordinated.
 10. No layout shop drawing will be reviewed without stamped and signed coordination assurance by General Contractor.
- B. Shop Drawings:
1. Layout drawings of mechanical equipment rooms and penthouses showing all related equipment and equipment clearances required by other trades.
 2. Layout drawings of areas in which it may be necessary to deviate substantially from layout shown on the drawings. Minor transitions in ductwork, if required due to job conditions, need not be submitted as long as the duct area is maintained. Show major relocation of ductwork and major changes in size of ducts. Coordinate shop drawings with all trades prior to ductwork fabrication.
 3. Details of intermediate structural steel members required to span main structural steel for the support of ductwork.
 4. Method of attachment of duct hangers to building construction.
 5. Duct material, gage, type of joints and duct reinforcing for each size range, including sketches or SMACNA plate numbers for joints, method of fabrication and reinforcing.

1.22 GUARANTEE

- A. Furnish guarantee covering all work in accordance with general requirements of the contract for minimum period of one year. This guarantee shall exist for a period of one (1) year from the date of final acceptance of the work and shall apply to defects in materials and to defective workmanship of any kind.
- B. For factory-assembled equipment and devices on which the manufacturers furnish standard published guarantees as regular trade practice, obtain such guarantees and replace any such equipment that proves defective during the life of these guarantees.
- C. Guarantee all work for which materials are furnished, fabricated or field erected by the contractor, all factory-assembled equipment for which no specific manufacturer's guarantee is furnished, and all work in connection with installing manufacturer's guarantee is furnished, and all work in connection with installing manufacturer's guaranteed equipment.
- D. In the event of failure of any work, equipment or device during the life of the guarantee, repair or replace the equipment or defective work. Remove, replace or restore, at no cost to the Owner, any part of the structure or building which may be damaged either as the direct result of the defective work or in the course of the contractor's making replacement of the defective work or materials. Work shall be done at a time and in a manner as to cause no undue inconvenience to the Owner.

Provide new materials, equipment, apparatus and labor to replace that determined by Engineer to be defective or faulty.

- E. This guarantee also applies to services including Instructions, Adjusting, Testing, Noise, Balancing, etc.
- F. Additional equipment and material guarantees and warranties may be indicated in other sections. In all cases, the more stringent guarantee or warranty shall be provided.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT QUALITY

- A. Material and equipment furnished under this Division of specification shall be new. Defective or inferior materials must be replaced by contractor at no cost to Owner regardless of the stage of construction. Inferior material shall be defined as material or equipment of a quality or performance less than that specified as determined by the Owner's Representative.
- B. Provide each item of equipment with manufacturer's identification tag which is readily accessible and clearly shows model and size.

2.2 ACCESS TO MECHANICAL WORK

- A. Access Doors:
 - 1. General: Where walls and ceilings must be penetrated for access to mechanical work, access doors shall be provided. Furnish adequate size for intended and necessary access. Furnish doors with UL Fire Rating to match wall or ceiling construction. Furnish manufacturer's complete units, of type recommended for application in indicated substrate construction, in each case, complete with anchorages and hardware.
- B. Access Door Construction: Refer to Section 083113 – ACCESS DOORS AND FRAMES

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Tests:
 - 1. Perform as specified in individual sections, and as required by authorities having jurisdiction.
 - 2. Duration as noted.
- B. Provide required labor, material, equipment, and connections.
- C. Furnish written report and certification those tests have been satisfactorily completed.
- D. Repair or replace defective work, as directed.
- E. Pay for restoring or replacing damaged work due to tests as directed.
- F. Pay for restoring or replacing damaged work of others, due to tests, as directed.

3.2 ACCESS TO MECHANICAL WORK

- A. Coordinate installation and placement of access doors and panels with contractor for general construction.
- B. Remove or replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION

This page intentionally left blank

SECTION 230002
MECHANICAL AND ELECTRICAL COORDINATION**PART 1 - GENERAL****1.1 WORK INCLUDED**

- A. Work Included in This Section: Materials, equipment, fabrication, installation, and tests in conformity with applicable codes and authorities having jurisdiction for the following:
1. Motors.
 2. Factory-wired equipment (FWE).
 3. Factory-wired control panels (FWCP).
 4. Motor controllers where provided as part of mechanical equipment.
 5. Motor controllers where supplied under Division 23 - Mechanical Work.
 6. Disconnects and safety switches for mechanical equipment.
 7. Fuses for equipment provided, and starters and disconnect switches.
 8. Emergency Pushbutton Operator Station.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 23 - HVAC Instrumentation and Controls, Motors.
- B. Installation and Power Wiring of Motor Controllers.

1.3 REFERENCE STANDARDS

- A. Published specifications standards, tests, or recommended methods of trade, industry or governmental organization as apply to work in this section where cited below:
1. ANSI - American National Standards Institute.
 2. NEMA - National Electrical Manufacturer's Association.
 3. IEEE - Institute of Electrical and Electronic Engineers.

1.4 QUALITY ASSURANCE

- A. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.
- B. Supply all equipment and accessories new and free from defects.
- C. Supply all equipment and accessories in compliance with the applicable standards listed in Article 1.03 of this Section and with all applicable National, State and local codes.
- D. All items of a given-type shall be the products of the same manufacturer.

1.5 DIVISION OF WORK

- A. This section delineates the work required to be performed by Contractors under Division 23 and Division 26.

1.6 WORK REQUIRED UNDER DIVISION 23

- A. Furnish motors, manual and combination starters, pushbutton devices, contactors, disconnect switches, electric thermostats, low voltage transformers, Emergency Break Glass Stations and other electrical devices required for equipment furnished.
- B. Install all items in piping and ductwork such as control valves, aquastats, ductstats, etc.
- C. All external wiring of equipment, all temperature control wiring, external wiring of control circuits of magnetic starters, interlocking wiring, boiler wiring, Emergency Break Glass Stations, and mounting of control devices, etc., shall be included under Division 23. All external wiring shall be in conduit. (Unless specifically shown to be provided by the Electrical Contractor)

- D. The Electrical Contractor, under Division 26, shall furnish and install all power wiring and conduit to junction box, to disconnect switch on unit, to motor starters and contactors, and between motor starters and contactors to motor or other load. Electrical Contractor shall be responsible for proper direction of rotation for all three phase equipment. The Electrical Contractor shall mount all starters, disconnects.
- E. Wiring required under Division 23 shall comply with the specifications as described in Division 26.
- F. The Plumbing Contractor, under Division 22, shall provide water and natural gas services to within two (2) feet of HVAC equipment requiring same and terminating with shut-off valves. The HVAC Contractor, under Division 23, shall make final connections to equipment.
- G. Provide disconnect switches or safety switches for equipment. (Unless specifically shown to be provided by the Electrical Contractor, starters and disconnects shown on the electrical drawings are for installation and do not require the Electrical Contractor to furnish units)
- H. Emergency Generator - Exhaust muffler and flexible exhaust connection shall be furnished by the generator manufacturer under Division 26. Installation of the exhaust system including providing piping, insulation and accessories shall be included under Division 23.

1.7 SUBMITTALS

- A. Shop Drawings: Complete wiring diagrams of all power and control connections (standard diagrams will not be accepted). Deliver 2 copies of approved wiring diagrams to the Electric Contractor for installation of wiring and connections required under the Electric Contract.
- B. Product Data for Motor Controllers and Disconnect Switches: Manufacturer's catalog sheets, specifications and installation instructions. Submit enclosure type coordinated for service and location. Submit simultaneously with product data required for motors. Identify each controller for use with corresponding motor. Submit shop drawings and product data in accordance with project requirements.
- C. All warranties shall be delivered as part of the close-out submission.
- D. A receipt shall be delivered as part of the close-out submission that states all required spare parts have been delivered to the owner. This receipt must be signed and dated by the owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Motor Controllers and Disconnects
 1. Square D
 2. Allen-Bradley
 3. General Electric
 4. Cutler-Hammer

2.2 MOTOR CONTROLLERS

- A. General: All starters shall be correctly sized to motor connected thereto. Provide one (1) additional auxiliary contact over and above that normally furnished, at least two (2) required. Provide overload heaters for each phase. Coordinate starters and controllers with the temperature control Contractor and sequence of operations.
- B. Minimum Size: The minimum allowable size of single or three phase magnetic motor controller is NEMA size 0.
- C. Enclosures: Unless otherwise indicated furnish NEMA 1 enclosures, except where installed outdoors furnish NEMA 3R enclosures.
- D. Control Power: Furnish control power transformer (maximum control voltage 120 volts) mounted within each magnetic motor controller enclosure.

- E. Pilot Lights: Furnish pilot lights of the neon lamp type mounted in the controller enclosure, green for running, red for not running.

2.3 MOTOR CONTROLLER TYPES:

- A. Type A (Full Voltage, Manual, Non-Magnetic):
1. Allen-Bradley Co. Bulletin 609 (or Bulletin 600 - single phase, 1 HP or less only).
 2. General Electric Co. CR-1062 (or CR-101 - single phase, 1 HP or less only).
 3. Cutler-Hammer. B100 (or MS - single phase, 1 HP or less only).
- B. Type A2 (2 Speed, 2 Winding, Full Voltage, Manual, Non-Magnetic):
1. Allen-Bradley Co. Bulletin 609TS (or Bulletin 600 - single phase, 1 HP or less only).
 2. General Electric Co. CR-1062 (or CR-101 - single phase, 1 HP or less only).
 3. Square D Co. Class 2512, Type M (or Class 2512, Type F - single phase, 1 HP or less only).
- C. Type B (Full Voltage Magnetic):
1. Allen-Bradley Co. Bulletin 709.
 2. General Electric Co. CR-206.
 3. Square D Co. Class 8536.
 4. Cutler-Hammer. ECN05.
- D. Type B-COM (Combination Full Voltage Magnetic/Safety Switch):
1. Allen-Bradley Co. Bulletin 712.
 2. General Electric Co. CR-208.
 3. Square D Co. Class 8538.
 4. Cutler-Hammer. ECN16.
- E. Type B2 (2 Speed, 2 Winding, Full Voltage, Magnetic):
1. Allen-Bradley Co. Bulletin 715.
 2. General Electric Co. CR209.
 3. Square D Co. Class 8810.
 4. Cutler-Hammer. ECN33.
- F. Type C (Automatic, Reduced Voltage, Magnetic):
1. Allen-Bradley Co. Bulletin 746.
 2. General Electric Co. CR-231.
 3. Square D Co. Class 8606.
 4. Cutler-Hammer. ECA42.
- G. Type C-COM (Combination Automatic, Reduced Voltage, Magnetic/ Safety Switch):
1. Allen-Bradley Co. Bulletin 746C.
 2. Square D Co. Class 8606.
 3. Cutler-Hammer. ECA43.
- H. Type D (Part Winding, Magnetic):
1. Allen-Bradley Co. Bulletin 736.
 2. General Electric Co. CR-230.
 3. Square D Co. Class 8640.
 4. Cutler-Hammer. ECA45.

2.4 REMOTE PUSH BUTTON STATIONS

- A. Start-Stop with pilot light in NEMA 1 enclosure unless otherwise indicated.
1. Allen-Bradley Co. Bulletin 800S.
 2. General Electric Co. CR-2943.
 3. Square D Co. Class 9001.

4. Cutler-Hammer. Class 10250.

2.5 SAFETY SWITCHES

- A. General Electric Co. Type TH; Square D Co. Heavy Duty Series; Cutler-Hammer HD Series; with the following:
 1. Fused switches equipped with fuseholders to accept only the fuses specified in Section 16181 (U.L. Class RK-1, RK-5, L).
 2. NEMA 1 enclosure unless otherwise indicated on drawing or required. 3R for devices installed outdoors.
 3. Switch rated 240V for 120V, 208V, 240V, circuits; 600 V for 277V, 480V circuits.
 4. Switch rated 600V for 277V, 480V circuits.
 5. Solid neutral bus when neutral or grounding conductor is included with circuit.
 6. Current rating and number of poles as indicated on drawings.

2.6 NAMEPLATES

- A. Phenolic Type: Standard phenolic nameplates with 3/8" minimum size lettering engraved thereon.
- B. Embossed Aluminum: Standard stamped or embossed aluminum tags: Tech Products, Inc., Seton Name Plate Corp.

2.7 EMERGENCY PUSHBUTTON OPERATOR STATION

- A. Acceptable Manufacturer: Square D or equal.
- B. Switch Style: Class 9001, NEMA 4 rated emergency mushroom head pushbutton.
- C. Voltage: 120VAC, 60Hz as required.
- D. Contacts: 20A, 2-NO/2-NC contact.
- E. Operation: Manual.
- F. Normal position: Operator out.
- G. Activated position: Operator in.
- H. Reset: Manual, turn to release.
- I. Enclosure: NEMA 4.

2.8 CUSTOM LEGEND PLATE

- A. "EMERGENCY BOILER SHUTOFF"

PART 3 - EXECUTION

3.1 GENERAL

- A. Equipment shall be connected in a neat and skillful manner. Equipment deliver with terminal boxes that are inadequate shall be equipped with special boxes that suit the conditions by the Mechanical Contractor furnishing the equipment.
- B. In general, rigid conduit or tubing shall be used, but equipment that requires movement or that would transmit vibration to conduit shall be wired with flexible (liquid tight) steel conduit not over 18" long.
- C. All equipment shall be grounded with a green-covered ground wire run inside the conduit and connected to equipment frame on one end and to grounding system on the other end.
- D. All electrical work required in the Mechanical Contract shall conform to the applicable requirements of Division 26 of these Specifications.
- E. The Heating, Ventilating, and Air Conditioning Contractor shall assign all Electrical Work required under his contract to the approved Automatic Temperature Control Contractor, who shall perform this work with qualified electricians employed by that Contractor.

- F. The Mechanical Contractors shall cooperate with the Contractor for Electrical Work in making all necessary tests and in receiving, storing, and setting all motor-driven equipment, electrical devices, and controls furnished and/or installed under these contracts.
- G. Install heaters correlated with full load current of motors provided.
- H. Set overload devices to suit motors provided.

3.2 INSTALLATION

- A. Control Wiring:
 - 1. Provide control wiring and connections.
 - 2. Where control circuit interlocking is required between individually mounted motor controllers, provide a single pole on-off switch in a threaded type box mounted adjacent to motor safety switches which are remote from the control transformer (to enable interlock circuit to be opened when the motor safety switch is opened).
- B. Nameplates: Rivet or bolt the nameplate on the cover of NEMA 1 enclosures. Rivet or bolt and gasket the nameplate on cover of NEMA 3R or NEMA 12 enclosures. Provide phenolic or embossed aluminum nameplates as follows:
 - 1. On each remote control station, indicating motor controlled.
 - 2. On each interlock circuit switch, indicating purpose of switch.
- C. Emergency Pushbutton Operator Station: Wire all switches in series with boiler control branch circuits.

3.3 TYPES OF MOTOR CONTROLLERS REQUIRED FOR SINGLE SPEED MOTORS (SYSTEMS UNDER 250 VOLTS)

- A. Single Phase Motors Less than 5 HP - Manually Operated: Type A.
- B. Single Phase Motors Less than 1/2 HP - Automatically Operated: Type A.
- C. Single Phase Motors 1/2 to 5 HP - Automatically Operated: Type B.
- D. Three Phase Squirrel Cage Motors Less than 7-1/2 HP: Type B (B-COM when indicated on drawings).
- E. Three Phase Squirrel Cage Motors 7-1/2 HP and Larger: Type C (C-COM when indicated on drawings).
- F. Three Phase Hermetically Sealed Compressor Motors Less than 7-1/2 HP: Type B.
- G. Three Phase Hermetically Sealed Compressor Motors 7-1/2 HP and Larger: Type D.

3.4 TYPES OF MOTOR CONTROLLERS REQUIRED FOR SINGLE SPEED MOTORS (277/480 VOLT SYSTEM)

- A. Single Phase Motors Less than 5 HP - Manually Operated: Type A.
- B. Single Phase Motors Less than 1 HP - Automatically Operated: Type A.
- C. Single Phase Motors 1 to 5 HP - Automatically Operated: Type B.
- D. Three Phase Squirrel Cage Motors Less than 15 HP: Type B (B-COM when indicated on drawings).
- E. Three Phase Squirrel Cage Motors 15 HP and Larger: Type C (C-COM when indicated on drawings).
- F. Three Phase Hermetically Sealed Compressor Motors Less than 15 HP: Type B.
- G. Three Phase Hermetically Sealed Compressor Motors 15 HP and Larger: Type D.

3.5 TYPES OF MOTOR CONTROLLERS REQUIRED FOR 2 SPEED MOTORS (SYSTEMS UNDER 250 VOLTS)

- A. Single Phase Motors Less than 5 HP - Manually Operated: Type A2.
- B. Single Phase Motors Less than 1/2 HP - Automatically Operated: Type A2.
- C. Single Phase Motors 1/2 to 5 HP - Automatically Operated: Type B2.
- D. Three Phase Squirrel Cage Motors Less than 7-1/2 HP: Type B2.

3.6 TYPES OF MOTOR CONTROLLERS REQUIRED FOR 2 SPEED MOTORS (277/480 VOLT SYSTEM)

- A. Single Phase Motors Less than 5 HP - Manually Operated: Type A2.
- B. Single Phase Motors Less than 1 HP - Automatically Operated: Type A2.
- C. Single Phase Motors 1 to 5 HP - Automatically Operated: Type B2.
- D. Three Phase Squirrel Cage Motors Less than 15 HP: Type B2.

3.7 DISCONNECTS

- A. Motor Controllers: Provide safety switch for all motor controllers. Provide combination type starter-disconnect unless otherwise noted on drawings.
- B. Motors: Provide a disconnect switch for all motors. Provide a separate safety switch for motors which are not within sight of the starter.
- C. Provide safety switches for all factory packaged equipment.
- D. Provide NEMA 3R safety switch for all rooftop and outdoor equipment.
- E. Provide unit mounted disconnect switches for all equipment such as unit heaters, fans, unit ventilators, incremental units, etc

3.8 EMERGENCY PUSHBUTTON OPERATOR STATION

- A. Provide Emergency Pushbutton Operator Station at each boiler room exit to de-energize the primary control circuit and to close the main fuel valves to stop the flow of fuel to the burner during an emergency.
- B. Review plans for locations.
- C. Provide all conduit and wiring for interlock of each boiler.

END OF SECTION

**SECTION 230513
COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General construction and requirements.
- B. Applications.
- C. Single phase electric motors.
- D. Three phase electric motors.
- E. Electronically Commutated Motors (ECM).

1.2 REFERENCE STANDARDS

- A. NEMA MG 1 - Motors and Generators 2018.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.
- D. Operation Data: Include instructions for safe operating procedures.
- E. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.6 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for motors larger than 20 horsepower.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Baldor Electric Company/ABB Group: www.baldor.com/#sle.
- B. Leeson Electric Corporation: www.leeson.com/#sle.
- C. Regal-Beloit Corporation (Century): www.centuryelectricmotor.com/#sle.
- D. Substitutions: See Section 016000 - Product Requirements.

2.2 GENERAL CONSTRUCTION AND REQUIREMENTS

- A. Construction:
 - 1. Open drip-proof type except where specifically noted otherwise.

16128.00

COMMON MOTOR
REQUIREMENTS FOR HVAC
EQUIPMENT

230513 - 2

- 2. Design for continuous operation in 104 degrees F environment.
- 3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
- B. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
- C. Wiring Terminations:
 - 1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
 - 2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.3 APPLICATIONS

- A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not comply with these specifications.
- B. Single phase motors for fans, blowers, and pumps: Capacitor start, capacitor run type.
- C. Motors located in exterior locations, wet air streams downstream of sprayed coil dehumidifiers, draw through cooling towers, air cooled condensers, humidifiers, direct drive axial fans, roll filters, explosion proof environments, and dust collection systems: Totally enclosed type.

2.4 SINGLE PHASE POWER - CAPACITOR START MOTORS

- A. Starting Torque: Three times full load torque.
- B. Starting Current: Less than five times full load current.
- C. Pull-up Torque: Up to 350 percent of full load torque.
- D. Breakdown Torque: Approximately 250 percent of full load torque.
- E. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with two capacitors in parallel with run capacitor remaining in circuit at operating speeds.
- F. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.
- G. Enclosed Motors: Class A (50 degrees C temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

2.5 ELECTRONICALLY COMMUTATED MOTORS (ECM)

- A. Applications:
 - 1. Commercial:
 - a. Power Roof Ventilator (PRV):
 - 1) Operating Mode: Constant cfm.
 - 2) Input: Motor manufacturer to coordinate control requirements with the control board of the PRV and/or specified sequence of operation.
 - 3) Shaft Extension: Single.
 - b. Energy Recovery Ventilator:
 - 1) Operating Mode: Constant cfm.
 - 2) Input: Motor manufacturer to coordinate control requirements with the control board of the energy recovery ventilator and/or specified sequence of operation.
 - 3) Shaft Extension: Single.

16128.00

COMMON MOTOR
REQUIREMENTS FOR HVAC
EQUIPMENT

230513 - 3

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
- C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

16128.00

COMMON MOTOR
REQUIREMENTS FOR HVAC
EQUIPMENT

230513 - 4

This page intentionally left blank

SECTION 230517
SLEEVES AND SLEEVE SEALS FOR HVAC PIPING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Pipe sleeves.
- B. Manufactured sleeve-seal systems.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 230719 - HVAC Piping Insulation.

1.3 REFERENCE STANDARDS

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type) 2022.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

PART 2 PRODUCTS**2.1 PIPE SLEEVES**

- A. Vertical Piping:
 - 1. Sleeve Length: 1 inch above finished floor.
 - 2. Provide sealant for watertight joint.
 - 3. Blocked Out Floor Openings: Provide 1-1/2 inch angle set in silicon adhesive around opening.
 - 4. Drilled Penetrations: Provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.
- B. Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- C. Pipe Passing Through Below Grade Exterior Walls:
 - 1. Zinc coated or cast iron pipe.
 - 2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.
- D. Pipe Passing Through Concrete Beam Flanges, except where Brass Pipe Sleeves are Specified:

1. Galvanized steel pipe or black iron pipe with asphalt coating.
 2. Connect sleeve with floor plate except in mechanical rooms.
- E. Pipe Passing Through Mechanical, Laundry, and Animal Room Floors above Basement:
1. Galvanized steel pipe or black iron pipe with asphalt coating.
 2. Connect sleeve with floor plate except in mechanical rooms.
- F. Clearances:
1. Provide allowance for insulated piping.
 2. Wall, Floor, Floor, Partitions, and Beam Flanges: 1 inch greater than external; pipe diameter.
 3. All Rated Openings: Caulked tight with fire stopping material in compliance with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

3.2 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Inserts:
 1. Provide inserts for placement in concrete formwork.
 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- E. Structural Considerations:
 1. Do not penetrate building structural members unless indicated.
- F. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
 1. Aboveground Piping:
 - a. Pack solid using mineral fiber in compliance with ASTM C592.
 - b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
 2. All Rated Openings: Caulk tight with fire stopping material in compliance with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.
 3. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.
- G. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.3 CLEANING

- A. Upon completion of work, clean all parts of the installation.

- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

END OF SECTION

This page intentionally left blank

**SECTION 230519
METERS AND GAUGES FOR HVAC PIPING****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Pressure gauges and pressure gauge taps.
- B. Thermometers and thermometer wells.
- C. Filter gauges.

1.2 REFERENCE STANDARDS

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments 2013.
- B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers 2014 (Reapproved 2020).
- C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers 2014 (Reapproved 2021).
- D. UL 393 - Indicating Pressure Gauges for Fire-Protection Service Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

1.4 FIELD CONDITIONS

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS**2.1 PRESSURE GAUGES**

- A. Manufacturers:
 - 1. Dwyer Instruments, Inc; [_____]: www.dwyer-inst.com/#sle.
 - 2. Moeller Instrument Company, Inc; [_____]: www.moellerinstrument.com/#sle.
 - 3. Omega Engineering, Inc; [_____]: www.omega.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
 - 1. Case: Steel with brass bourdon tube.
 - 2. Size: 4-1/2 inch diameter.
 - 3. Mid-Scale Accuracy: One percent.
 - 4. Scale: Psi.

2.2 PRESSURE GAUGE TAPPINGS

- A. Needle Valve: Brass, 1/4 inch NPT for minimum 150 psi.
- B. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.
- C. Syphon: Steel, Schedule 40, 1/4 inch angle or straight pattern.

2.3 STEM TYPE THERMOMETERS

- A. Manufacturers:

1. Dwyer Instruments, Inc; [_____]: www.dwyer-inst.com/#sle.
 2. Omega Engineering, Inc; [_____]: www.omega.com/#sle.
 3. Weksler Glass Thermometer Corp; [_____]: www.wekslerglass.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
1. Size: 9 inch scale.
 2. Window: Clear Lexan.
 3. Stem: 3/4 inch NPT brass.
 4. Accuracy: 2 percent, per ASTM E77.
 5. Calibration: Degrees F.

2.4 THERMOMETER SUPPORTS

- A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.
- B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.5 TEST PLUGS

- A. Test Plug: 1/4 inch or 1/2 inch brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install pressure gauges on the inlet and outlet piping of all hydronic zones, hydronic coils, and heat transfer equipment.
- C. Install pressure gauges upstream and downstream of all pressure reducing valves.
- D. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.
- E. Install thermometers in air duct systems on flanges.
- F. Install thermometers in the return duct, outside air duct, inlet duct, and supply duct of all air handling systems and terminal units.
- G. Install thermometers on the inlet and outlet piping of all hydronic zones, hydronic coils, and heat transfer equipment.
- H. Locate duct mounted thermometers minimum 10 feet downstream of mixing dampers, coils, or other devices causing air turbulence.
- I. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- J. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- K. Adjust gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- L. Locate test plugs adjacent to pressure gauges and pressure gauge taps.

END OF SECTION

SECTION 230523
GENERAL-DUTY VALVES FOR HVAC PIPING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Applications.
- B. Ball valves.
- C. Check valves.

1.2 RELATED REQUIREMENTS

- A. Section 230553 - Identification for HVAC Piping and Equipment.
- B. Section 230719 - HVAC Piping Insulation.
- C. Section 232113 - Hydronic Piping.
- D. Section 232213 - Steam and Condensate Heating Piping.

1.3 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. SWP: Steam working pressure.
- I. TFE: Tetrafluoroethylene.
- J. WOG: Water, oil, and gas.

1.4 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch 2013 (Reaffirmed 2018).
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2020.
- C. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard 2020.
- D. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves 2017.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- F. ASME B16.34 - Valves — Flanged, Threaded, and Welding End 2020.
- G. ASME B31.9 - Building Services Piping 2020.
- H. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.
- I. AWWA C606 - Grooved and Shouldered Joints 2015.
- J. MSS SP-45 - Drain and Bypass Connections 2020.
- K. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves 2019.
- L. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010, with Errata .

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.6 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Obtain valves for each valve type from single manufacturer.
 - 2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
 - 2. Protect valve parts exposed to piped medium against rust and corrosion.
 - 3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
 - 4. Adjust globe, gate, and angle valves to the closed position to avoid clattering.
 - 5. Secure check valves in either the closed position or open position.
 - 6. Adjust butterfly valves to closed or partially closed position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection and protect flanges and specialties from dirt.
 - a. Provide temporary inlet and outlet caps.
 - b. Maintain caps in place until installation.
 - 2. Store valves in shipping containers and maintain in place until installation.
 - a. Store valves indoors in dry environment.
- C. Exercise the following precautions for handling:
 - 1. Handle large valves with sling, modified to avoid damage to exposed parts.
 - 2. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS**2.1 APPLICATIONS**

- A. Provide the following valves for the applications if not indicated on drawings:
 - 1. Throttling (Hydronic): Ball.
 - 2. Isolation (Shutoff): Butterfly and Ball.
- B. Required Valve End Connections for Non-Wafer Types:
 - 1. Copper Tube:
 - a. 2 NPS and Smaller: Threaded ends (Exception: Solder-joint valve-ends).
- C. Heating Hot Water Valves:
 - 1. 2 NPS and Smaller, Brass and Bronze Valves:
 - a. Threaded ends.
 - b. Ball: Full port, two piece, stainless steel trim.
 - c. Swing Check: Bronze disc, Class 125.
 - d. Globe: Bronze disc, Class 125.

2.2 GENERAL REQUIREMENTS

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
 - 1. Handwheel: Valves other than quarter-turn types.
 - 2. Hand Lever: Quarter-turn valves 6 NPS and smaller.
- D. Valves in Insulated Piping: Provide 2 NPS stem extensions and the following features:
 - 1. Gate Valves: Rising stem.
 - 2. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 - 3. Butterfly Valves: Extended neck.
 - 4. Memory Stops: Fully adjustable after insulation is installed.
- E. Memory Stops: Fully adjustable after insulation is installed.
- F. Valve-End Connections:
 - 1. Threaded End Valves: ASME B1.20.1.
 - 2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
 - 3. Pipe Flanges and Flanged Fittings 1/2 NPS through 24 NPS: ASME B16.5.
 - 4. Solder Joint Connections: ASME B16.18.
 - 5. Grooved End Connections: AWWA C606.
- G. General ASME Compliance:
 - 1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
 - 2. Building Services Piping Valves: ASME B31.9.
- H. Bronze Valves:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- I. Valve Bypass and Drain Connections: MSS SP-45.
- J. Source Limitations: Obtain each valve type from a single manufacturer.

2.3 BRONZE, BALL VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Two Piece, Full Port with Stainless Steel Trim:
 - 1. Comply with MSS SP-110.
 - 2. SWP Rating: 150 psig.
 - 3. CWP Rating: 600 psig.
 - 4. Body: Forged bronze or dezincified-brass alloy.
 - 5. Ends: Threaded.
 - 6. Seats: PTFE.
 - 7. Stem: Stainless steel.
 - 8. Ball: Stainless steel, vented.

2.4 BRONZE, SWING CHECK VALVES

- A. Class 125: CWP Rating: 200 psig (1380 kPa) and Class 150: CWP Rating: 300 psig (2070 kPa).
 - 1. Comply with MSS SP-80, Type 3.

2. Body Design: Horizontal flow.
3. Body Material: Bronze, ASTM B62.
4. Ends: Threaded.
5. Disc: Bronze.

2.5 CHAINWHEELS

- A. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
 2. Attachment: For connection to ball, butterfly, and plug valve stems.
 3. Sprocket Rim with Chain Guides: Ductile iron include zinc coating.
 4. Chain: Hot-dip galvanized steel. Sized to fit sprocket rim.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Discard all packing materials and verify that valve interior, including threads and flanges, are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

3.2 INSTALLATION

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Install check valves where necessary to maintain direction of flow as follows:
1. Swing Check: Install horizontal maintaining hinge pin level.

END OF SECTION

SECTION 230529
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Support and attachment components for equipment, piping, and other HVAC/hydronic work.

1.2 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
B. Section 055000 - Metal Fabrications : Materials and requirements for fabricated metal supports.

1.3 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General - Purpose Piping 2014 (Reapproved 2020).
D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).
F. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
H. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2021.
I. MFMA-4 - Metal Framing Standards Publication 2004.
J. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
 - 1. Application of protective inserts, saddles, and shields at pipe hangers for each type of insulation and hanger.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Installer Qualifications for Field-Welding: As specified in Section 055000.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS**2.1 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
 - 1. Comply with MSS SP-58.
 - 2. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 4.0. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 - 6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
 - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Materials for Metal Fabricated Supports: Comply with Section 055000.
- C. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Ferguson Enterprises Inc: www.fnw.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
 2. Provide factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
 3. Comply with MFMA-4.
 4. Channel Material:
 - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
 5. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
 6. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
- D. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch diameter.
 - b. Piping up to 1 inch (27 mm) nominal: 1/4 inch diameter.
 - c. Piping larger than 1 inch (27 mm) nominal: 3/8 inch diameter.
 - d. Trapeze Support for Multiple Pipes: 3/8 inch diameter.
- E. Thermal Insulated Pipe Supports:
1. Manufacturers:
 - a. Buckaroos, Inc: www.buckaroos.com/#sle.
 - b. KB Enterprises: www.snappitz.com/#sle.
 2. General Construction and Requirements:
 - a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
 - b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
 - c. Pipe supports to be provided for nominally sized, 1/2 inch to 30 inch iron pipes.
 - d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by a 360 degree, PVC jacketing.
 3. PVC Jacket:
 - a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
 - b. Minimum Service Temperature: Minus 40 degrees F.
 - c. Maximum Service Temperature: 180 degrees F.
 - d. Moisture Vapor Transmission: 0.0071 perm inch, when tested in accordance with ASTM E96/E96M.
 - e. Thickness: 60 mil.
 - f. Connections: Brush on welding adhesive.
 4. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on drawings.
 5. Products:
 - a. Buckaroos, Inc; CoolDry: www.buckaroos.com/#sle.
- F. Pipe Supports:
1. Liquid Temperatures Up To 122 degrees F:
 - a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
 - b. Support From Below: MSS SP-58 Types 35 through 38.

2. Operating Temperatures from 122 to 446 degrees F:
 - a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.
 - b. Roller Support: MSS SP-58 Types 41 or 43 through 46, with appropriate saddle of MSS SP-58 Type 39 for insulated pipe.
 - c. Sliding Support: MSS SP-58 Types 35 through 38.
- G. Pipe Stanchions: For pipe runs, use stanchions of same type and material where vertical adjustment is required for stationary pipe.
 1. Manufacturers:
 - a. Anvil International; H-Block: www.anvilintl.com/#sle.
 2. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
 3. Provide coated or plated saddles to isolate steel hangers from dissimilar metal tube or pipe.
- H. Beam Clamps: MSS SP-58 Types 19 through 23, 25 or 27 through 30 based on required load.
 1. Manufacturers:
 - a. Ferguson Enterprises Inc: www.fnw.com/#sle.
 2. Material: ASTM A36/A36M carbon steel or ASTM A181/A181M forged steel.
 3. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
- I. Riser Clamps:
 1. Manufacturers:
 - a. Ferguson Enterprises Inc; [_____]: www.fnw.com/#sle.
 2. Provide copper plated clamps for copper tubing support.
 3. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
- J. Offset Pipe Clamps: Double-leg design two-piece pipe clamp.
- K. Strut Clamps: Two-piece pipe clamp.
- L. Insulation Clamps: Two bolt-type clamps designed for installation under insulation.
- M. Pipe Hangers: For a given pipe run, use hangers of the same type and material.
 1. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
 2. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
- N. Intermediate Pipe Guides: Use pipe clamps with oversize pipe sleeve that provides clearance around pipe.
 1. Pipe Diameter 6 inches and Smaller: Provide minimum clearance of 0.16 inch.
 2. Pipe Diameter 8 inches: Provide U-bolts with double nuts providing minimum clearance of 0.28 inch.
 3. Pipe Diameter 8 inches: 0.625 inch U-bolt.
 4. Pipe Diameter 10 inches: 0.75 inch U-bolt.
 5. Pipe Diameter 12 to 16 inches: 0.875 inch U-bolt.
 6. Pipe Diameter 18 to 30 inches: 1 inch U-bolt.
- O. Pipe Alignment Guides: Galvanized steel.
 1. Pipe Diameter 8 inches and Smaller: Spider or sleeve type.
 2. Pipe Diameter 10 inches and Larger: Roller type.
- P. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.
- Q. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
 1. Manufacturers:

- a. Anvil International; H-Block: www.anvilintl.com/#sle.
 - b. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - c. Erico International Corporation, a brand of Pentair: www.erico.com/#sle.
 - d. Ferguson Enterprises Inc: www.fnw.com/#sle.
 - e. PHP Systems/Design: www.phpsd.com/#sle.
 - f. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
2. Provide steel pedestals with thermoplastic or rubber base that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
 3. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 5. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
- R. Pipe Shields for Insulated Piping:
1. Manufacturers:
 - a. Anvil International: www.anvilintl.com/#sle.
 2. General Construction and Requirements:
 - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
 - b. Shields Material: UV-resistant polypropylene with glass fill.
 - c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
 - d. Minimum Service Temperature: Minus 40 degrees F.
 - e. Maximum Service Temperature: 178 degrees F.
 - f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- S. Anchors and Fasteners:
1. Manufacturers - Mechanical Anchors:
 - a. Hilti, Inc: www.us.hilti.com/#sle.
 - b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.
 - c. Powers Fasteners, Inc: www.powers.com/#sle.
 - d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.
 2. Manufacturers - Powder-Actuated Fastening Systems:
 - a. Hilti, Inc: www.us.hilti.com/#sle.
 - b. ITW Ramset, a division of Illinois Tool Works, Inc: www.ramset.com/#sle.
 - c. Powers Fasteners, Inc: www.powers.com/#sle.
 - d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.
 3. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 4. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
 5. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 6. Hollow Masonry: Use toggle bolts.
 7. Hollow Stud Walls: Use toggle bolts.
 8. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 9. Sheet Metal: Use sheet metal screws.
 10. Wood: Use wood screws.
 11. Plastic and lead anchors are not permitted.
 12. Hammer-driven anchors and fasteners are not permitted.

- 13. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Comply with MFMA-4.
 - b. Channel Material: Use galvanized steel.
 - c. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.
 - d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
 - 14. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
- T. Pipe Installation Accessories:
- 1. Copper Pipe Supports:
 - a. Manufacturers:
 - 1) HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - 2. Thermal Insulated Pipe Supports:
 - a. Manufacturers:
 - 1) HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - 3. Overhead Pipe Supports:
 - a. Manufacturers:
 - 1) HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - 4. Plenum Pipe Supports:
 - a. Manufacturers:
 - 1) HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - 5. Telescoping Pipe Supports:
 - a. Manufacturers:
 - 1) HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - 6. Inserts and Clamps:
 - a. Manufacturers:
 - 1) HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.

2.2 RETROFIT PIPING COVER SYSTEM

- A. Manufacturers:
 - 1. DecoShield Systems, Inc: www.decoshield.com/#sle.
- B. General Requirements:
 - 1. Surface Burning Characteristics: Flame spread index/smoke developed index of 20/250, maximum, when tested in accordance with ASTM E84 or UL 723.
- C. Materials:
 - 1. Piping Cover System: Removal-resistant, modular, snap-fit cover units, clips, and anchors for use with CPVC, steel, and copper piping systems.
 - 2. Cover Units: L-shaped and U-shaped cross-section units of flame retardant resin material, paintable finish.
 - 3. Unit Length: 7.5 feet.
 - 4. Provide coupling fittings for joining units end to end and prefabricated inside and outside corner fittings and end caps as required.
 - 5. Provide mounting clips to secure covers to wall-ceiling per manufacturer requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.

- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Field-Welding (where approved by Architect): Comply with Section 055000.
- H. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- I. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch high concrete pad constructed in accordance with Section 033000.
 - 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- J. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- K. Secure fasteners according to manufacturer's recommended torque settings.
- L. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

This page intentionally left blank

SECTION 230553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Adhesive-backed duct markers.
- D. Pipe markers.
- E. Ceiling tacks.

1.2 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

- A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- F. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS**2.1 IDENTIFICATION APPLICATIONS**

- A. Air Handling Units: Nameplates.
- B. Automatic Controls: Tags. Key to control schematic.
- C. Control Panels: Nameplates.
- D. Dampers: Ceiling tacks, where located above lay-in ceiling.
- E. Ductwork: Adhesive-backed markers.
- F. Heat Transfer Equipment: Nameplates.
- G. Instrumentation: Tags.
- H. Major Control Components: Nameplates.
- I. Piping: Pipe markers.
- J. Relays: Tags.
- K. Small-sized Equipment: Tags.
- L. Thermostats: Nameplates.
- M. Valves: Tags and ceiling tacks where located above lay-in ceiling.
- N. Water Treatment Devices: Nameplates.

2.2 NAMEPLATES

- A. Manufacturers:
 - 1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com/#sle.
 - 2. Brimar Industries, Inc: www.pipemarker.com/#sle.
 - 3. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 - 4. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 5. Seton Identification Products, a Tricor Direct Company: www.seton.com/#sle.
- B. Letter Color: White.
- C. Letter Height: 1/4 inch.
- D. Background Color: Black.
- E. Plastic: Comply with ASTM D709.

2.3 TAGS

- A. Manufacturers:
 - 1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
 - 2. Brady Corporation: www.bradycorp.com/#sle.
 - 3. Brimar Industries, Inc: www.pipemarker.com/#sle.
 - 4. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 - 5. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 6. Seton Identification Products, a Tricor Company: www.seton.com/#sle.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- D. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 ADHESIVE-BACKED DUCT MARKERS

- A. Manufacturers:
 - 1. Brimar Industries, Inc: www.pipemarker.com/#sle.
 - 2. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 - 3. Seton Identification Products, a Tricor Company: www.seton.com/#sle.
- B. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.
- C. Style: Individual Label.
- D. Color: Green/White Green/White.

2.5 PIPE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation; [_____]: www.bradycorp.com/#sle.
 - 2. Brimar Industries, Inc; [_____]: www.pipemarker.com/#sle.
 - 3. Craftmark Pipe Markers; [_____]: www.craftmarkid.com/#sle.
 - 4. Kolbi Pipe Marker Co; [_____]: www.kolbipipemarkers.com/#sle.
 - 5. Seton Identification Products, a Tricor Company; [_____]: www.seton.com/#sle.
- B. Color: Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- E. Color code as follows:
 - 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

2.6 CEILING TACKS

- A. Manufacturers:
 - 1. Craftmark Pipe Markers; [_____]: www.craftmarkid.com/#sle.
- B. Description: Steel with 3/4 inch diameter color coded head.
- C. Color code as follows:
 - 1. HVAC Equipment: Yellow.
 - 2. Fire Dampers and Smoke Dampers: Red.
 - 3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

3.2 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Use tags on piping 3/4 inch diameter and smaller.
 - 1. Identify service, flow direction, and pressure.
 - 2. Install in clear view and align with axis of piping.
 - 3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- F. Install ductwork with adhesive-backed duct markers. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- G. Locate ceiling tacks to locate dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

This page intentionally left blank

**SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Measurement of final operating condition of HVAC systems.

1.2 RELATED REQUIREMENTS

- A. Section 019113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.
- B. Section 230800 - Commissioning of HVAC.

1.3 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems 2008, with Errata (2019).
- C. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems 2015, with Errata (2017).
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing 2002.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Submit to Architect.
 - 2. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Identification and types of measurement instruments to be used and their most recent calibration date.
 - d. Final test report forms to be used.
 - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 5. Units of Measure: Report data in I-P (inch-pound) units only.

6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Report date.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 3. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 2. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
 - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 4. Duct systems are clean of debris.
 5. Fans are rotating correctly.
 6. Fire and volume dampers are in place and open.
 7. Air coil fins are cleaned and combed.
 8. Access doors are closed and duct end caps are in place.
 9. Air outlets are installed and connected.

- 10. Duct system leakage is minimized.
- 11. Hydronic systems are flushed, filled, and vented.
- 12. Pumps are rotating correctly.
- 13. Service and balance valves are open.

- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations.
- B. Provide additional balancing devices as required.

3.4 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
 - 1. Running log of events and issues.
 - 2. Discrepancies, deficient or uncompleted work by others.
 - 3. Contract interpretation requests.
 - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- F. Check and adjust systems approximately six months after final acceptance and submit report.

3.6 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 Pitot tube 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 extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- 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. Make allowances for 50 percent loading of filters.

- G. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- H. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- I. Where modulating dampers are provided, take measurements and balance at extreme conditions.

3.7 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.8 SCOPE

- A. Test, adjust, and balance the following:
 - 1. Sprinkler Air Compressor.
 - 2. Air Coils.
 - 3. Terminal Heat Transfer Units.
 - 4. Air Handling Units.
 - 5. Fans.
 - 6. Air Terminal Units.
 - 7. Air Inlets and Outlets.

3.9 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
 - 1. Manufacturer.
 - 2. Model/Frame.
 - 3. HP/BHP.
 - 4. Phase, voltage, amperage; nameplate, actual, no load.
 - 5. RPM.
 - 6. Service factor.
 - 7. Starter size, rating, heater elements.
 - 8. Sheave Make/Size/Bore.
- B. V-Belt Drives:
 - 1. Identification/location.
 - 2. Required driven RPM.
 - 3. Driven sheave, diameter and RPM.
 - 4. Belt, size and quantity.
 - 5. Motor sheave diameter and RPM.
 - 6. Center to center distance, maximum, minimum, and actual.
- C. Heating Coils:

1. Identification/number.
 2. Location.
 3. Service.
 4. Manufacturer.
 5. Air flow, design and actual.
 6. Water flow, design and actual.
 7. Water pressure drop, design and actual.
 8. Entering water temperature, design and actual.
 9. Leaving water temperature, design and actual.
 10. Entering air temperature, design and actual.
 11. Leaving air temperature, design and actual.
 12. Air pressure drop, design and actual.
- D. Air Moving Equipment:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Arrangement/Class/Discharge.
 6. Air flow, specified and actual.
 7. Return air flow, specified and actual.
 8. Outside air flow, specified and actual.
 9. Total static pressure (total external), specified and actual.
 10. Inlet pressure.
 11. Discharge pressure.
 12. Sheave Make/Size/Bore.
 13. Number of Belts/Make/Size.
 14. Fan RPM.
- E. Return Air/Outside Air:
1. Identification/location.
 2. Design air flow.
 3. Actual air flow.
 4. Design return air flow.
 5. Actual return air flow.
 6. Design outside air flow.
 7. Actual outside air flow.
 8. Return air temperature.
 9. Outside air temperature.
 10. Required mixed air temperature.
 11. Actual mixed air temperature.
 12. Design outside/return air ratio.
 13. Actual outside/return air ratio.
- F. Exhaust Fans:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Air flow, specified and actual.
 6. Total static pressure (total external), specified and actual.

- 7. Inlet pressure.
- 8. Discharge pressure.
- 9. Sheave Make/Size/Bore.
- 10. Number of Belts/Make/Size.
- 11. Fan RPM.
- G. Duct Traverses:
 - 1. System zone/branch.
 - 2. Duct size.
 - 3. Area.
 - 4. Design velocity.
 - 5. Design air flow.
 - 6. Test velocity.
 - 7. Test air flow.
 - 8. Duct static pressure.
- H. Flow Measuring Stations:
 - 1. Identification/number.
 - 2. Location.
 - 3. Size.
 - 4. Manufacturer.
 - 5. Model number.
 - 6. Serial number.
 - 7. Design Flow rate.
 - 8. Design pressure drop.
 - 9. Actual/final pressure drop.
 - 10. Actual/final flow rate.
 - 11. Station calibrated setting.
- I. Terminal Unit Data:
 - 1. Manufacturer.
 - 2. Type, constant, variable, single, dual duct.
 - 3. Identification/number.
 - 4. Location.
 - 5. Model number.
 - 6. Size.
 - 7. Minimum static pressure.
 - 8. Minimum design air flow.
 - 9. Maximum design air flow.
 - 10. Maximum actual air flow.
 - 11. Inlet static pressure.
- J. Air Distribution Tests:
 - 1. Air terminal number.
 - 2. Room number/location.
 - 3. Terminal type.
 - 4. Terminal size.
 - 5. Area factor.
 - 6. Design velocity.
 - 7. Design air flow.
 - 8. Test (final) velocity.

OLV HUMAN SERVICES

16128.00

TESTING, ADJUSTING, AND
BALANCING FOR HVAC

REV-UP! RENOVATIONS

230593 - 7

9. Test (final) air flow.
10. Percent of design air flow.

END OF SECTION

This page intentionally left blank

**SECTION 230713
DUCT INSULATION**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.
- C. Insulation jackets.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 230553 - Identification for HVAC Piping and Equipment.
- C. Section 233100 - HVAC Ducts and Casings: Glass fiber ducts.

1.3 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2020a.
- E. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
- F. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- G. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation 2020.
- H. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material) 2019.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- J. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2021.
- K. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- L. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.
- M. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
1. CertainTeed Corporation: www.certainteed.com/#sle.
 2. Johns Manville: www.jm.com/#sle.
 3. JP Lamborn Co; Thermal Sleeve MT: www.jpflex.com/#sle.
 4. Knauf Insulation; Atmosphere Duct Wrap: www.knaufinsulation.com/#sle.
 5. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 6. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
1. K value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
 2. Maximum Service Temperature: 1200 degrees F.
 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 3. Secure with pressure sensitive tape.
- D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- E. Indoor Vapor Barrier Mastic:
1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- F. Outdoor Vapor Barrier Mastic:
1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- G. Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter.

2.3 GLASS FIBER, RIGID

- A. Manufacturer:
1. CertainTeed Corporation: www.certainteed.com/#sle.

2. Johns Manville: www.jm.com/#sle.
 3. Knauf Insulation: www.knaufinsulation.com/#sle.
 4. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.
 5. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C612; rigid, noncombustible blanket.
1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
 2. Maximum Service Temperature: 450 degrees F.
 3. Maximum Water Vapor Absorption: 5.0 percent.
 4. Maximum Density: 8.0 lb/cu ft.
- C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 3. Secure with pressure sensitive tape.
- D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- E. Indoor Vapor Barrier Finish:
1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric.
 2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.4 EXPANDED POLYSTYRENE INSULATION

- A. Manufacturers:
1. Knauf Insulation.
- B. Insulation: Closed-cell, light-weight, resilient, foamed plastic composed of hydrogen and carbon.

2.5 JACKETS

- A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.
1. Lagging Adhesive:
 - a. Manufacturers:
 - 1) Design Polymeric; DP 3050 Water Based, Zero VOC, Premium Quality, Lagging Adhesive, and Vapor Retarder: www.designpoly.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements
 - b. Compatible with insulation.
- B. Aluminum Jacket: ASTM B209 (ASTM B209M).
1. Thickness: 0.016 inch sheet.
 2. Finish: Smooth.
 3. Joining: Longitudinal slip joints and 2 inch laps.
 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
 - 1. Provide insulation with vapor barrier jackets.
 - 2. Finish with tape and vapor barrier jacket.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - 4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated Ducts Conveying Air Above Ambient Temperature:
 - 1. Provide with standard vapor barrier jacket.
 - 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor): Finish with canvas jacket sized for finish painting.
- F. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- G. Slope exterior ductwork to shed water.
- H. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 3. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
- I. Duct and Plenum Liner Application:
 - 1. Adhere insulation with adhesive for 90 percent coverage.
 - 2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
 - 3. Seal and smooth joints. Seal and coat transverse joints.
 - 4. Seal liner surface penetrations with adhesive.
 - 5. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES

- A. Exhaust Ducts Within 10 ft of Exterior Openings:
 - 1. Flexible Glass Fiber Duct Insulation: 1-1/2 inches thick.
 - 2. Rigid Glass Fiber Duct Insulation: 1-1/2 inches thick.
- B. Outside Air Intake Ducts:
 - 1. Insulation:
 - a. Flexible Glass Fiber Duct Insulation:
 - 1) Thickness required to provide an R value not less than R-12.
 - b. Rigid Glass Fiber Duct Insulation:
 - 1) Thickness required to provide an R value not less than R-12.
- C. Supply Ducts:
 - 1. First 10 ft from unit supply/return connections
 - a. Duct Liner
 - 2. Other than first 10 ft from supply connection
 - a. Flexible Glass Fiber Duct Insulation:
 - 1) Thickness required to provide an R value not less than R-6.

- b. Rigid Glass Fiber Duct Insulation:
 - 1) Thickness required to provide an R value not less than R-6.
- 3. In Mechanical Rooms:
 - a. Rigid Glass Fiber Duct Insulation:
 - 1) Thickness required to provide an R value not less than R-6.
- D. Return and Relief Ducts in Mechanical Rooms:
 - 1. Rigid Glass Fiber Duct Insulation:
 - a. Thickness required to provide an R value not less than R-6.
- E. Ducts in Unconditioned Spaces:
 - 1. Insulation:
 - a. Expanded Polystyrene Insulation.
 - 1) Thickness required to provide an R value not less than R-12.
 - b. Rigid Glass Fiber Duct Insulation:
 - 1) Thickness required to provide an R value not less than R-12.
 - 2. Jacket:
 - a. Aluminum Jacket or Flexible Weather-Proofing Outdoor Jacket

END OF SECTION

This page intentionally left blank

**SECTION 230719
HVAC PIPING INSULATION**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Jackets and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 232113 - Hydronic Piping: Placement of hangers and hanger inserts.
- C. Section 232213 - Steam and Condensate Heating Piping: Placement of hangers and hanger inserts.
- D. Section 232300 - Refrigerant Piping: Placement of inserts.

1.3 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- D. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.
- E. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2019).
- F. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement 2007 (Reapproved 2019).
- G. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- H. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation 2017.
- I. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.
- J. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).
- K. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation 2021.
- L. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces 2008 (Reapproved 2019).
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- N. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2021.
- O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, RIGID

- A. Manufacturers:
 - 1. CertainTeed Corporation; []: www.certainteed.com/#sle.
 - 2. Johns Manville Corporation; []: www.jm.com/#sle.
 - 3. Knauf Insulation; Earthwool 1000 Degree Pipe Insulation: www.knaufinsulation.com/#sle.
 - 4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
 - 5. Owens Corning Corporation; VaporWick Pipe Insulation: www.ocbuildingspec.com/#sle.
 - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
 - 1. K Value: ASTM C177, 0.23 at 75 degrees F.
 - 2. Maximum Service Temperature: 220 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- F. Vapor Barrier Lap Adhesive: Compatible with insulation.
- G. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
- H. Fibrous Glass Fabric:
 - 1. Cloth: Untreated; 9 oz/sq yd weight.
 - 2. Blanket: 1.0 lb/cu ft density.
 - 3. Weave: 5 by 5.

- I. Indoor Vapor Barrier Finish:
 - 1. Cloth: Untreated; 9 oz/sq yd weight.
 - 2. Vinyl emulsion type acrylic, compatible with insulation, black color.
- J. Outdoor Vapor Barrier Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- K. Insulating Cement: ASTM C449.

2.3 HYDROUS CALCIUM SILICATE

- A. Manufacturers:
 - 1. Johns Manville Corporation; [_____]: www.jm.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C533 and ASTM C795; rigid molded, asbestos free, gold color.
 - 1. K Value: 0.40 at 300 degrees F, when tested in accordance with ASTM C177 or ASTM C518.
 - 2. Maximum Service Temperature: 1200 degrees F.
 - 3. Density: 15 lb/cu ft.
- C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- D. Insulating Cement: ASTM C449.

2.4 JACKETS

- A. PVC Plastic.
 - 1. Manufacturers:
 - a. Johns Manville Corporation; [_____]: www.jm.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
 - 2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F.
 - b. Maximum Service Temperature: 150 degrees F.
 - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil.
 - e. Connections: Brush on welding adhesive.
 - 3. Covering Adhesive Mastic: Compatible with insulation.
- B. Aluminum Jacket: ASTM B209 (ASTM B209M) formed aluminum sheet.
 - 1. Thickness: 0.016 inch sheet.
 - 2. Finish: Smooth.
 - 3. Joining: Longitudinal slip joints and 2 inch laps.
 - 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 - 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.
- C. Vapor Barrier Membranes: ASTM C1136, Type IX.
 - 1. Multilayer Laminate Vapor Barrier:
 - a. Thickness: 2.4 mil.
 - b. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96/E96M.
 - c. Manufacturers:
 - 1) Polyguard Products; ZERO-PERM: www.polyguardproducts.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.

2.5 ACCESSORIES

- A. General Requirements:

1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
 2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
 3. Comply with ASTM C795 requirements for materials to be used on stainless steel surfaces.
 4. Supply materials that are asbestos free.
- B. Corrosion Inhibitors:
1. Corrosion Control Gel:
 - a. Manufacturers:
 - 1) Polyguard Products; RG2400LT: www.polyguardproducts.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
 - b. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated Pipes Conveying Fluids Below Ambient Temperature:
 1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:
 1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
 1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I. Inserts and Shields:
 1. Application: Piping 1-1/2 inches diameter or larger.
 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 3. Insert location: Between support shield and piping and under the finish jacket.
 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.
- K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.
- L. Concealed Piping: Finish with fitting covers on flanges, fittings, valves, and specialties.
- M. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.

3.3 SCHEDULE

- A. Heating Systems:
 1. Heating Water Supply and Return:
 - a. NPS 1-1/4 and Smaller: 1-1/2 inch thick Rigid Glass Fiber.
 - b. NPS 1-1/2 and Larger: 2 inch thick Rigid Glass Fiber.

END OF SECTION

This page intentionally left blank

SECTION 230913
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Control panels.
- B. Control Valves:
 - 1. Ball valves and actuators.
 - 2. Electronic operators.
- C. Dampers.
- D. Damper Operators:
 - 1. Electric operators.
- E. HVAC&R Sensors:
 - 1. Temperature sensors.
 - 2. Static pressure (air pressure) sensors.

1.2 RELATED REQUIREMENTS

- A. Section 230993 - Sequence of Operations for HVAC Controls.
- B. Section 232113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, and gauge taps.
- C. Section 232114 - Hydronic Specialties.
- D. Section 233300 - Air Duct Accessories: Installation of automatic dampers.
- E. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- F. Section 262726 - Wiring Devices: Elevation of exposed components.

1.3 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.
- B. ANSI/FCI 70-2 - Control Valve Seat Leakage 2021.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- D. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
- E. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
- F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.5 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Substantial Completion.

PART 2 PRODUCTS**2.1 EQUIPMENT - GENERAL**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.2 CONTROL PANELS

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. NEMA 250, general purpose utility enclosures with enameled finished face panel.
- C. Provide common keying for all panels.

2.3 CONTROL VALVES

- A. Ball Valves and Actuators:
 - 1. Service: Use for hot water.
 - 2. Flow Characteristic: Include 2-way operation configured to fail normally closed (NC).
 - 3. Replacements in Kind: Provide pressure-independent type.
 - 4. Rangeability: 500 to 1.
 - 5. ANSI Rating: Class 150.
 - 6. Leakage: Class IV (0.1 percent of rated capacity) per ANSI/FCI 70-2.
 - 7. Body Size:
 - a. Under 2-1/2 inches:
 - 1) Connection: NPT.
 - 2) Materials:
 - (a) Body: Brass.
 - (b) Flanges: Ductile iron.
 - (c) Ball: Chrome-plated brass.
 - (d) Stem: Nickel-plated brass.
 - (e) Seat: Graphite-reinforced PTFE with EPDM O-Ring backing.
 - (f) Stem Seal: EPDM O-Rings.
 - (g) Flow Control Disk: Thermoplastic synthetic-resin.
 - b. Service Temperature:
 - 1) Fluid Side: 0 to 284 degrees F liquid or 25 psig steam.
 - 2) Ambient Side: From minus 4 to 122 degrees F.
 - 8. Actuator Requirements:
 - a. Assembly: Factory-mounted.
 - b. Input: 0 to 5 VDC configured for proportional control.
 - c. Accessories: Provide with valve position indicator and manual override.

2.4 DAMPERS

- A. Performance: Test in accordance with AMCA 500-D.
- B. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gauge, 0.1046 inch.

- C. Blades: Galvanized steel, maximum blade size 8 inches wide, 48 inches long, minimum 22 gauge, 0.0299 inch, attached to minimum 1/2 inch shafts with set screws.
- D. Blade Seals: Synthetic elastomeric, inflatable, mechanically attached, field replaceable.
- E. Jamb Seals: Spring stainless steel.
- F. Shaft Bearings: Oil impregnated sintered bronze.
- G. Linkage Bearings: Oil impregnated sintered bronze.
- H. Leakage: Less than one percent based on approach velocity of 2000 fpm and 4 in-wc.
- I. Maximum Pressure Differential: 6 in-wc.
- J. Temperature Limits: Minus 40 to 200 degrees F.

2.5 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
 - 1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 - 2. Provide one operator for maximum 36 sq ft damper section.
- B. Electric Operators:
 - 1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.6 HVAC&R SENSORS

- A. Temperature Sensors:
 - 1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
 - 2. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F.
 - 3. Performance Characteristics:
 - a. RTD:
 - 1) Room Sensor Accuracy: Plus/minus 0.50 degrees F minimum.
 - 2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F minimum.
 - 3) Range: Minus 40 degrees F through 220 degrees F minimum.
 - b. Wire Resistance:
 - 1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F or use temperature transmitter when offset is greater than 1.0 degree F due to wire resistance.
 - c. Immersion Temperature Sensors: A sensor encased in a corrosion-resistant probe with an indoor junction box service entry body.
 - d. Ceiling and Recessed Mount Temperature Sensors: Ceiling-mounted sensor in a low-profile housing.
 - e. Room Security Sensors: Stainless steel cover plate with insulated back and security screws.
 - f. Room Temperature Sensors:
 - g. Room Temperature Sensors with Integral Digital Display:
 - 1) Provide a four button keypad with the following capabilities:
 - (a) Setpoint adjustment to accommodate room setpoint, DDC Input/Output Points List, and Sequence of Operation.
 - (b) Display and control fan operation status.

- (c) Manual occupancy override and indication of occupancy status.
 - (d) Controller mode status.
- B. Static Pressure (Air Pressure) Sensors:
1. Unidirectional with ranges not exceeding 150 percent of maximum expected input.
 2. Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F.
 3. Accuracy: One percent of full scale with repeatability 0.3 percent.
 4. Output: 0 to 5 vdc with power at 12 to 28 vdc.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- F. Ensure installation of components is complementary to installation of similar components.
- G. 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 in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidistats; see Section 262726.
- C. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.3 MAINTENANCE

- A. Provide service and maintenance of control system for one year from Date of Substantial Completion.
- B. Provide complete service of controls systems, including call backs, and submit written report of each service call.
- C. In addition to normal service calls, make minimum of [____] complete normal inspections of approximately [____] hours duration to inspect, calibrate, and adjust controls.

END OF SECTION

**SECTION 230914
FLOW INSTRUMENTS**

PART 1 GENERAL

1.1 REFERENCES

- A. UL-873, Temperature Reading and Indicating Equipment
- B. UL 60730-1, 60730-2-9, Automated Electrical Controls
- C. FCC Part 15

1.2 SUBMITTALS

- A. Submit under the provisions of Section 013000
- B. Product Data: Manufacturer's data sheets on each product being used, including:
 - 1. Equipment schedule.
 - 2. Product overview and technical specifications.
 - 3. Operations and maintenance manual.
 - 4. Wiring diagrams.
 - 5. Product placement guide.
 - 6. Sensor density table.
- C. Independent Test Reports: Provide a copy of each of the following test reports:
 - 1. NIST Report of Airflow Calibration
 - 2. CHEMIR Test Report on Sensor Exposure to Salts and Acids.
 - 3. UL Certificate Report
 - 4. CE Certification form (European shipments)
 - 5. FCC Part 15 compliance report.
 - 6. BTL Certification Report.
- D. Quality Assurance
 - 1. Manufacturer Qualifications: Company specializing in manufacturing thermal dispersion airflow measurement devices with minimum ten years documented experience.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products in an environment that is protected from rain, snow and/or condensing moisture.
- C. Handle with care during installation.
- D. Protect sensors from construction debris and remove all debris that may enter the air distribution system prior to system startup.

1.4 SYSTEM STARTUP AND VERIFICATION

- A. Startup and verify products in accordance with manufacturers procedures in the operations and maintenance manual.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS AND EXCLUSIONS

- A. Provide one thermal airflow measuring device (AMD) for each location indicated on plans, schedules and/or control diagrams. Fan inlet measurement devices shall not be substituted for duct or plenum measurement devices indicated on the plans.
- B. Each AMD shall use the principle of thermal dispersion to determine the actual or mass airflow rate of the airstream. Differential pressure-based devices, including pitot tubes, pitot arrays, piezo-rings and devices measuring the pressure drop across a louver, damper or obstruction are not acceptable.

- C. Each sensor node shall consist of two hermetically sealed bead-in-glass thermistors. The airflow of each sensor node shall be determined using one self-heated and ambient temperature sensing thermistor. Devices using indirectly heated thermistors to determine the airflow rate are not acceptable. Devices using chip thermistors of any type or packaging are not acceptable. Devices using platinum wire RTDs or similar “hot wire” devices are not acceptable.
- D. All internal wiring in the probe tube shall be chemical and abrasion resistant Kynar® coated copper.
- E. All connections to internal wires in the probe tube shall be solder joints or welds. Connectors of any type in the probe tube are not acceptable.
- F. Each thermistor shall be independently calibrated to NIST traceable temperature standards to establish the resistance-temperature characteristics for the determination of airflow and temperature. Devices using interchangeable, curve-matched, thermistors are not acceptable.
- G. The airflow sensing thermistor of each sensor node shall be self-heated. Devices using Indirectly heated thermistors are not acceptable.
- H. Remote transmitters shall be mounted in a location protected from moisture, rain and snow with an ambient temperature between -20 and 120 °F [-28.9 to 48.9 °C] and a humidity range between 5 and 95% RH (non-condensing). Provide a weatherproof enclosure and mount away from direct sunlight when outdoor mounting is required.
- I. Probes with remote transmitters shall be “plug and play”, not require matching to the transmitter, and be provided with a UL listed, FEP jacketed, plenum rated cable and connector plug. Devices using PVC jacketed cables to connect sensor probes to the transmitter are not acceptable.
- J. Each AMD shall be UL/cUL listed as a final assembly and FCC-Part 15 compliant. Compliance shall be demonstrated by an independent test laboratory.

2.2 HARDWARE

- A. Basis of Design: EBTRON models GTx116-P+, GTx-108FI and GTx116e-PC. Approved equal: Sierra and Kurz.
- B. Each AMD shall utilize thermal dispersion technology to measure velocity. Pressure differential systems, including piezo rings and pitot tubes, shall not be acceptable.
- C. Probes shall be suitable for installation in ducts, plenums, air handling equipment and outdoor air intakes to determine the airflow rate and velocity weighted temperature of the airstream.
- D. Provide one to four gold anodized 6063 aluminum probes and one remote transmitter.
- E. Each sensor node shall be individually wind-tunnel calibrated at 16 points to NIST traceable airflow standards and have an accuracy of $\pm 2\%$ of reading over the entire operating range. Provide a copy of the NIST calibration report for the reference standard used to calibrate the production tunnels used to calibrate individual sensor nodes. Reference standards calibrated to third-party NIST traceable labs are not acceptable. Devices claiming AMCA certification are not acceptable.
- F. Provide up to 16 sensing nodes per measurement location as required for the opening size and published sensor density tables to achieve an installed airflow accuracy of $\pm 3\%$ ($\pm 5\%$ of reading on close coupled outdoor air intakes) between 0 and 5,000 fpm [0 to 25.4 m/s] over a temperature range of -20 to 160 °F [-28.9 to 71.1 °C] and a humidity range between 0 and 100% RH (non-condensing).
- G. Provide the velocity weighted temperature of the airstream with an accuracy of ± 0.15 °F [0.08 °C].
- H. Provide low and high airflow alarms with a user defined setpoint and tolerance.
- I. Transmitter interface shall be two isolated, field selectable (4-20mA, 0-5/0-10 VDC) analog output signals (flow plus temperature, humidity, enthalpy, dewpoint or alarm) and one isolated RS-485, field selectable (BACnet MS/TP or Modbus RTU) network connection.

- J. Provide a Bluetooth, low-energy interface and free Android® or iOS® software that allows real-time airflow and temperature monitoring and airflow and temperature traverses. Software shall capture, save and/or e-mail airflow/temperature data, transmitter settings and diagnostics information.
- K. Fan Array and Single Fan Measurement.
1. Each AMD shall be suitable for installation in fan inlets to determine the airflow rate and velocity weighted temperature of the airstream. Piezo rings are not acceptable.
 2. Provide face, forward mount adjustable brackets for each sensor node. Mount styles shall not affect the airflow or sound performance of plenum fans.
 3. Provide the following number of sensor nodes based on fan type. All sensors shall be connected to a single, remote transmitter. Fan array models shall calculate the airflow of each fan individually prior to outputting the total airflow rate and have a built-in alarm capable of removing a failed fan from the total airflow calculation.

END OF SECTION

This page intentionally left blank

SECTION 230993
SEQUENCE OF OPERATIONS FOR HVAC CONTROLS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. This section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other sections.
- B. Sequence of operation for:

1.2 RELATED REQUIREMENTS

- A. Section 230913 - Instrumentation and Control Devices for HVAC.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Sequence of Operation Documentation: Submit written sequence of operation for entire HVAC system and each piece of equipment.
 - 1. Preface: 1 or 2 paragraph overview narrative of the system describing its purpose, components and function.
 - 2. State each sequence in small segments and give each segment a unique number for referencing in Functional Test procedures; provide a complete description regardless of the completeness and clarity of the sequences specified in Contract Documents.
 - 3. Include at least the following sequences:
 - a. Start-up.
 - b. Warm-up mode.
 - c. Normal operating mode.
 - d. Unoccupied mode.
 - e. Shutdown.
 - f. Capacity control sequences and equipment staging.
 - g. Temperature and pressure control, such as setbacks, setups, resets, etc.
 - h. Detailed sequences for all control strategies, such as economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
 - i. Sequences for all alarms and emergency shut downs.
 - j. Seasonal operational differences and recommendations.
 - k. Interactions and interlocks with other systems.
 - 4. Include initial and recommended values for all adjustable settings, setpoints and parameters that are typically set or adjusted by operating staff; and any other control settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.
 - 5. For packaged controlled equipment, include manufacturer's furnished sequence of operation amplified as required to describe the relationship between the packaged controls and the control system, indicating which points are adjustable control points and which points are only monitored.
 - 6. Include schedules, if known.
- C. Control System Diagrams: Submit graphic schematic of the control system showing each control component and each component controlled, monitored, or enabled.
 - 1. Label with settings, adjustable range of control and limits.
 - 2. Include flow diagrams for each control system, graphically depicting control logic.
 - 3. Include the system and component layout of all equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral

- controls.
- 4. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
- 5. Include all monitoring, control and virtual points specified in elsewhere.
- 6. Include a key to all abbreviations.
- D. Points List: Submit list of all control points indicating at least the following for each point.
 - 1. Name of controlled system.
 - 2. Point abbreviation.
 - 3. Display unit.
 - 4. Control point or setpoint (Yes / No); i.e. a point that controls equipment and can have its setpoint changed.
 - 5. Monitoring point (Yes / No); i.e. a point that does not control or contribute to the control of equipment but is used for operation, maintenance, or performance verification.
 - 6. Intermediate point (Yes / No); i.e. a point whose value is used to make a calculation which then controls equipment, such as space temperatures that are averaged to a virtual point to control reset.
 - 7. Calculated point (Yes / No); i.e. a “virtual” point generated from calculations of other point values.
- E. Project Record Documents: Record actual locations of components and setpoints of controls, including changes to sequences made after submission of shop drawings.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 HVAC CONTROL SEQUENCES

- A. All HVAC equipment shall operate in occupied/unoccupied modes as determined by the DDC building time clock system. Obtain the building occupancy schedule from the Owner.

3.2 GENERAL OCCUPIED/UNOCCUPIED OPERATION

- A. Scheduling:
 - 1. All HVAC equipment shall operate on an occupied/unoccupied schedule as provided by the Owner.
- B. Day/Night:
 - 1. Day:
 - a. Normal day mode - setpoints are set at variable temperatures, depending on species requirements for heating and for cooling (if available). Outside air is admitted to meet ventilation and cooling requirements as outlined in the individual unit sequences. Mechanical cooling, if equipped is utilized as outlined in the individual unit sequences.
 - b. Each space has a system operator settable setpoint bias to either raise or lower the setpoints for occupant comfort.
 - 2. Night:
 - a. Heating and cooling setpoints are, again, variable based on species requirements.
 - b. Outside air shall be equal to daytime ventilation rates.
- C. Occupied/Unoccupied:
 - 1. Occupied:
 - a. Units will be energized and will provide the proper ventilation as required during occupancy of the spaces. Setpoints will be as described for the individual areas for normal human comfort.
 - 2. Unoccupied:

- a. Equipment will be de-energized and outside air ventilation will be disabled. Temperature setpoints will be setback and equipment will maintain setback setpoints without ventilation.
- D. Warm-up Mode:
1. The heating setpoint shall be incremented up from night heating setpoint to day heating setpoint.
 2. The increment value shall be determined by outside air temperature and a user adjustable optimal start period and the difference between the occupied and unoccupied setpoints.
 3. Once the heating setpoint exceeds the incremented setpoint warm-up shall commence.
 4. The heating source shall be modulated to maintain occupied heating setpoint.
- 3.3 EXISTING GYM UNIT VENTILATORS AND ASSOCIATED EXHAUST FAN:**
- A. Unit ventilator shall operate in occupied/unoccupied modes as determined by the DDC building time clock system.
- B. Assign each unit ventilator a stagger start number to keep too many units from starting at the same time. In effect, this flattens load peaks.
- C. Occupied heating set-point, unoccupied heating set-point, occupied cooling set-point, unoccupied cooling set-point and purge enable/disable shall be global and fully adjustable from any interface.
- D. Outside air is admitted to meet ventilation and cooling requirements as outlined in the individual unit sequences.
- E. Each unit ventilator shall have a software HOA for control of the supply fan.
- F. Wire the supply fan normally open at the control relay and fail off.
- G. Control cycle to follow ASHRAE Cycle II Standard.
- H. Temperature Set Points:
1. Occupied heating = 69 degrees (adjustable)
 2. Unoccupied heating = 55 degrees (adjustable)
- I. Purge Mode Control:
1. Purge mode (fresh air changeover) shall only be permitted during an unoccupied period.
 2. If the outside air is between 45°F and 60°F and the space temperature rises above 75°F, the supply fan shall be commanded on, the mixing dampers shall be fully open, the heating coil shall be fully closed and the associated exhaust fan shall be enabled at the maximum airflow. When the space temperature drops to 70°F, the fans shall be commanded off and the mixing dampers shall return to the normal position.
- J. Warm-Up Mode Control:
1. Optimum start duration shall be determined based on outside air temperature.
 2. During the optimum start period, the heating set-point will be linearly ramped up from unoccupied heating set-point to occupied heating set-point.
 3. When the heating set-point crosses above the space temperature, the supply fan will be commanded on, the mixing dampers shall remain closed and the heating valve will modulate to maintain heating set-point.
- K. Occupied Mode:
1. Unit Ventilator:
 - a. Supply Fan:
 - 1) Enable continuously.
 - b. Associated Exhaust Fan:
 - 1) Enable continuously.
 - 2) Fan to automatically vary to maintain neutral space pressure.

- c. Outside Air Damper:
 - 1) Open to maintain outside air quantity as scheduled, outside air damper shall never be positioned below this minimum except in case of emergency.
 - 2) Modulate outside air damper beyond scheduled minimum position as follows:
 - (a) Maintain minimum mixed air temperature in heating mode.
- d. Hot Water Coil Control Valve:
 - 1) LAT schedule
 - (a) Utilize discharge air minimum temperature reset schedule as outlined below.
 - (1) 55°F LAT at 55°F OAT
 - (2) 65°F LAT at 0°F OAT.
 - (b) Utilize discharge air temperature PID loop to maintain space temperature set point and minimum LAT.
 - 2) Outside air temperature drops below 35 degrees:
 - (a) Modulate full open. (Valve shall stay full open until O.A. rises above 38 degrees).
 - 3) Outside air temperature above 38 degrees:
 - (a) Modulate to maintain space temperature set point.
 - (b) Modulate to maintain 65 degrees minimum discharge air temperature during heating mode
- L. Unoccupied Mode:
 - 1. Unit Ventilators
 - a. Supply Fan:
 - 1) Start (2°F below heating set point) and stop (1°F above heating set point) to maintain space temperature set point.
 - b. Relief Fan:
 - 1) Disable.
 - c. Outside Air Damper:
 - 1) Fully closed.
 - d. Hot Water Coil Control Valve:
 - 1) Same as occupied mode.
 - e. RA Damper:
 - 1) Fully open.
- M. Alarms – Provide an alarm for each of the following:
 - 1. Fan fails to run after 30 seconds of being commanded on.
 - 2. Fan fails to stop after 30 seconds of being commanded off.
 - 3. Software safety trip.
 - 4. Software safety lockout (4 safety trips in 3 hours).
 - 5. Low or high discharge air temperatures.
 - a. If the discharge air temperature falls below 40°F (adjustable) in heating mode, open the heating hot water control valve, close the outdoor air damper and turn off all fans.
 - 6. Low or high space temperatures.

3.4 ENERGY RECOVERY UNITS WITH HOT WATER COILS

- A. Time Schedule: Start and stop supply and remote exhaust fans. Determine fan status through auxiliary contactors in motor starter. If fan fails to start as commanded, signal alarm.
- B. The ERV system consists of a constant volume supply fan, constant volume return/exhaust fan, outside air dampers, energy recovery plate, and a duct mounted hot water reheat coil. Components shall adhere to the following sequence.

- C. Automatic/Manual Control
 - 1. The units disconnect is accompanied by a H-O-A (hand/off/auto) switch on the starter panel. In the “H” position, the system shall be energized, and the system safety devices shall protect the circuit. With the H-O-A switch on the starter panel in the “H” position, the unit shall start. With the H-O-A switch in the “A” position, the unit shall operate in response to BMS control and system safety circuits.
- D. Occupied Mode
 - 1. The “time of day” program for occupied times shall cause the constant volume supply and return/exhaust fans to start and run continuously and controls to be energized. The ERV control shall be energized and switched from unoccupied temperature setting to the occupied setting.
- E. Unoccupied Mode
 - 1. The “time of day” program shall cause the air handling unit to go to unoccupied mode settings when called for by the schedule program. The ERV will denenergize and the outside air damper and return/exhaust air damper shall remain closed.
 - 2. When the occupied override button is depressed on the space sensor, the unit shall go into occupied mode for a predetermined amount of time of 2 hours (adj.).
- F. Alarms
 - 1. Fan Failure
 - a. If status of a fan, which has been called by the BMS system to start, has not been verified as running within a period of 10 seconds (adj.), an alarm shall be sent to the operator's workstation. The fan shall be identified by a description of what it serves, (i.e., ERV-1 supply fan) and shall be tagged as a “fan failure”.
 - 2. Low Limit Thermostat
 - a. If the air leaving the ERV coil drops below 38 degrees f (adj.) the supply fan shall be stopped via hard wire interlock and the BMS system shall be alerted by a set of dry contacts provided by the low limit thermostat. An alarm shall be sent to the operator's workstation. The unit shall be identified by its call number (i.e. ERV-1) and shall be tagged as a “low limit thermostat alarm”. The unit must be manually reset before it can be restarted.

3.5 GYM DESTRATIFICATION FANS

- A. Time Schedule: Start and stop fans. Determine fan status by current sensing devices. If fan fails to start as commanded, signal alarm.
- B. Safety Devices:
 - 1. Smoke Detector: Stop fans, close outside dampers, and close smoke dampers if smoke is detected; signal alarm.
- C. Automatically vary fan speed based upon temperature differential between ceiling and occupied zone temperature sensors.

END OF SECTION

This page intentionally left blank

**SECTION 232113
HYDRONIC PIPING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hydronic system requirements.
- B. Heating water piping, above grade.
- C. Heating water and glycol piping, above grade.
- D. Pipe hangers and supports.
- E. Unions, flanges, mechanical couplings, and dielectric connections.

1.2 RELATED REQUIREMENTS

- A. Section 083100 - Access Doors and Panels.
- B. Section 230719 - HVAC Piping Insulation.
- C. Section 232114 - Hydronic Specialties.
- D. Section 232500 - HVAC Water Treatment: Pipe cleaning.

1.3 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2021.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- C. ASME B31.9 - Building Services Piping 2020.
- D. ASTM B32 - Standard Specification for Solder Metal 2020.
- E. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.
- F. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
- G. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers 1992, with Editorial Revision (2018).
- H. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding 2019.
- I. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
 - 2. Provide manufacturers catalog information.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 HYDRONIC SYSTEM REQUIREMENTS

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:

1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
 3. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:

2.2 HEATING WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:
1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
 - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
 - b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
 2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

2.3 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
 3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
 5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
 6. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
 7. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.4 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

- A. Unions for Pipe of 2 Inches and Less:

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment using jointing system specified.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- E. After completion, fill, clean, and treat systems. See Section 232500 for additional requirements.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and to avoid interference with use of space.
- D. Group piping whenever practical at common elevations.
- E. Slope piping and arrange to drain at low points.
- F. Inserts:

1. Provide inserts for placement in concrete formwork.
 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- G. Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
 2. Support horizontal piping as scheduled.
 3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
 4. Place hangers within 12 inches of each horizontal elbow.
 5. Use hangers with 1-1/2 inches minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 8. Provide copper plated hangers and supports for copper piping.
- H. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 230719.
- I. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 3100.
- J. Install valves with stems upright or horizontal, not inverted.

3.3 SCHEDULES

- A. Hanger Spacing for Copper Tubing.
1. 1/2 Inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 2. 1 Inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.

END OF SECTION

This page intentionally left blank

**SECTION 232114
HYDRONIC SPECIALTIES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air vents.
- B. Strainers.
- C. Pressure-temperature test plugs.
- D. Balancing valves.

1.2 RELATED REQUIREMENTS

- A. Section 232113 - Hydronic Piping.

1.3 REFERENCE STANDARDS

1.4 ADMINISTRATIVE REQUIREMENTS

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.
- C. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 AIR VENTS

- A. Manual Air Vent: Short vertical sections of 2-inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.
- B. Maximum Fluid Pressure: 150 psi.
- C. Maximum Fluid Temperature: 250 degrees F.

2.2 STRAINERS

- A. Size 2 inch and Under:
 - 1. Provide threaded, grooved, or sweat brass or iron body for up to 175 psi working pressure, Y-pattern strainer with 1/32 inch stainless steel perforated screen.
 - 2. Body Material by Fluid Service:
 - a. Brass:
 - 1) Liquids: Up to 400 psi at 150 degrees F.

2.3 PRESSURE-TEMPERATURE TEST PLUGS

- A. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F.
- B. Application: Use extended length plugs to clear insulated piping.

2.4 BALANCING VALVES

- A. Size 2 inch and Smaller:
 - 1. Provide ball or globe style with flow balancing, shut-off capabilities, memory stops, and minimum of two metering ports and female sweat, NPT threaded, or soldered connections.
 - 2. Metal construction materials consist of bronze or brass.
 - 3. Non-metal construction materials consist of Teflon, EPDM, or engineered resin.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.
- B. Where large air quantities can accumulate, provide enlarged air collection standpipes.
- C. Provide manual air vents at system high points and as indicated.
- D. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.

3.2 MAINTENANCE

- A. See Section 017000 - Execution Requirements for additional requirements relating to maintenance service.
- B. Provide service and maintenance of glycol system for one year from date of Substantial Completion at no extra charge to Owner.
- C. Perform monthly visit to make glycol fluid concentration analysis on site with refractive index measurement instrument. Report findings in detail in writing, including analysis and amounts of glycol or water added.
- D. Explain corrective actions to Owner's maintenance personnel in person.

END OF SECTION

**SECTION 233100
HVAC DUCTS AND CASINGS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Casings and plenums.
- C. Duct cleaning.

1.2 RELATED REQUIREMENTS

- A. Section 230593 - Testing, Adjusting, and Balancing for HVAC.
- B. Section 230713 - Duct Insulation: External insulation and duct liner.
- C. Section 233300 - Air Duct Accessories.
- D. Section 233700 - Air Outlets and Inlets.

1.3 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- E. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements 2015.
- F. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements 2015.
- G. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.
- H. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.
- I. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- J. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.
- K. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual 2012.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for duct materials.
- C. Shop Drawings: Indicate duct fittings, particulars such as gauges, sizes, welds, and configuration prior to start of work for [] pressure class and higher systems.
- D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).

1.5 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 DUCT ASSEMBLIES

- A. Regulatory Requirements: Construct ductwork to comply with NFPA 90A standards.
- B. Ducts: Galvanized steel, unless otherwise indicated.
- C. Low Pressure Supply (Heating Systems): 2 inch wg pressure class, galvanized steel.
- D. Return and Relief: 2 inch wg pressure class, galvanized steel.
- E. General Exhaust: 1 inch wg pressure class, galvanized steel.
- F. Transfer Air and Sound Boots: 1/2 inch wg pressure class, galvanized steel.

2.2 MATERIALS

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - 2. VOC Content: Not more than 250 g/L, excluding water.
 - 3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 - 4. Manufacturers:
 - a. Carlisle HVAC Products; Hardcast Versa-Grip 181 Water Based Fiber Reinforced Duct Sealant: www.carlislehvac.com/#sle.
 - b. Design Polymerics; DP 1010 Water Based Smooth Duct Sealant, Zero VOC, Premium Quality: www.designpoly.com/#sle.
 - c. Ductmate Industries, Inc, a DMI Company; [____]: www.ductmate.com/#sle.
- C. Gasket Tape: Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle rings connections.
- D. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- E. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
 - 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 - 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
 - 5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
 - 6. Other Types: As required.

2.3 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
- B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
- C. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- D. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
- E. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.

- F. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- G. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.4 MANUFACTURED DUCTWORK AND FITTINGS

- A. Spiral Ducts: Round spiral lockseam duct with galvanized steel outer wall.
 - 1. Manufacture in accordance with SMACNA (DCS).
- B. Round Ducts: Round lockseam duct with galvanized steel outer wall.
 - 1. Manufacture in accordance with SMACNA (DCS).
- C. Flexible Ducts: Two ply vinyl film supported by helically wound spring steel wire.
 - 1. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
 - 2. Pressure Rating: 10 inches wg positive and 1.0 inches wg negative.
 - 3. Maximum Velocity: 4000 fpm.
 - 4. Temperature Range: Minus 10 degrees F to 160 degrees F.
- D. Transverse Duct Connection System: SMACNA "E" rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
- E. Round Duct Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).

2.5 CASINGS AND PLENUMS

- A. Fabricate casings in accordance with SMACNA (DCS) and construct for operating pressures indicated.
- B. Mount floor mounted casings on 4 inch high concrete curbs. At floor, rivet panels on 8 inch centers to angles. Where floors are acoustically insulated, provide liner of galvanized 18 gauge, 0.0478 inch expanded metal mesh supported at 12 inch centers, turned up 12 inches at sides with sheet metal shields.
- C. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- D. Flexible Ducts: Connect to metal ducts with adhesive.
- E. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- 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. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

- I. Use double nuts and lock washers on threaded rod supports.
- J. Connect terminal units to supply ducts directly or with one foot maximum length of flexible duct. Do not use flexible duct to change direction.
- K. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

3.2 CLEANING

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

END OF SECTION

**SECTION 233300
AIR DUCT ACCESSORIES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct access doors.
- B. Duct test holes.
- C. Fire dampers.
- D. Flexible duct connectors.
- E. Volume control dampers.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 233100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.
- C. UL 33 - Safety Heat Responsive Links for Fire-Protection Service Current Edition, Including All Revisions.
- D. UL 555 - Standard for Fire Dampers Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Fusible Links: One of each type and size.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 DUCT ACCESS DOORS

- A. Manufacturers:
 - 1. Ductmate Industries, Inc, a DMI Company; [____]: www.ductmate.com/#sle.
 - 2. Elgen Manufacturing Company, Inc; [____]: www.elgenmfg.com/#sle.
 - 3. Nailor Industries, Inc; [____]: www.nailor.com/#sle.
 - 4. Ruskin Company; [____]: www.ruskin.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Access doors with sheet metal screw fasteners are not acceptable.

2.2 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.3 FIRE DAMPERS

A. Manufacturers:

1. Lloyd Industries, Inc: www.firedamper.com/#sle.
2. Nailor Industries, Inc: www.nailor.com/#sle.
3. Ruskin Company: www.ruskin.com/#sle.
4. United Enertech: www.unitedenertech.com/#sle.
5. Ward Industries, a brand of Hart and Cooley, Inc; [_____]: www.wardind.com/#sle.
6. Substitutions: See Section 016000 - Product Requirements.

B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.

C. Horizontal Dampers: Galvanized steel, 22 gauge, 0.0299 inch frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

D. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream.

E. Fusible Links: UL 33, separate at 160 degrees F with adjustable link straps for combination fire/balancing dampers.

2.4 FLEXIBLE DUCT CONNECTORS

A. Manufacturers:

1. Carlisle HVAC Products; Dynair Connector Plus G90 Steel Offset Seam Neoprene Fabric: www.carlislehvac.com/#sle.
2. Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
3. Elgen Manufacturing Company, Inc: www.elgenmfg.com/#sle.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Flexible Duct Connections: Fabric crimped into metal edging strip.

D. Maximum Installed Length: 14 inch.

2.5 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
2. Nailor Industries, Inc: www.nailor.com/#sle.
3. Ruskin Company: www.ruskin.com/#sle.
4. United Enertech: www.unitedenertech.com/#sle.
5. Substitutions: See Section 016000 - Product Requirements.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Splitter Dampers:

D. Single Blade Dampers:

1. Fabricate for duct sizes up to 6 by 30 inch.
2. Blade: 24 gauge, 0.0239 inch, minimum.

E. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

1. Blade: 18 gauge, 0.0478 inch, minimum.

- F. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 233100 for duct construction and pressure class.
- B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 by 8 inch size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch for balancing dampers only. Review locations prior to fabrication.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by Authorities Having Jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- E. Demonstrate re-setting of fire dampers to Owner's representative.
- F. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- G. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- H. Use splitter dampers only where indicated.
- I. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

This page intentionally left blank

**SECTION 233700
AIR OUTLETS AND INLETS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Registers/grilles:
 - 1. Ceiling-mounted, exhaust and return register/grilles.
 - 2. Ceiling-mounted, supply register/grilles.

- B. Louvers:

1.2 REFERENCE STANDARDS

- A. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

PART 2 PRODUCTS

2.1 CEILING SUPPLY REGISTERS/GRILLES

- A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, one-way deflection.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- C. Construction: Made of aluminum extrusions with factory enamel finish.
- D. Construction: Made of 14 gauge steel.
- E. Color: As selected by Architect from manufacturer's standard range.

2.2 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Steel with 14 gauge minimum frames and 14 gauge minimum blades, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's standard range.

2.3 LOUVERS

- A. Type: 4 inch deep frame with blades on 45 degree slope with center baffle and return bend, heavy channel frame, 1/2 inch square mesh screen over intake or exhaust end.
- B. Fabrication: 16 gauge, 0.0598 inch (1.52 mm) thick galvanized steel thick galvanized steel welded assembly, with factory prime coat finish.
- C. Color: To be selected by Architect from manufacturer's standard range.
- D. Mounting: Furnish with exterior flat flange for installation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- C. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- D. Paint ductwork visible behind air outlets and inlets matte black, see Section 099123.

END OF SECTION

SECTION 237200
AIR-TO-AIR ENERGY RECOVERY EQUIPMENT**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Energy recovery ventilators.

1.2 RELATED REQUIREMENTS

- A. Section 230548 - Vibration and Seismic Controls for HVAC.
- B. Section 230923 - Direct-Digital Control System for HVAC.
- C. Section 260583 - Wiring Connections.

1.3 REFERENCE STANDARDS

- A. AHRI 1060 (I-P) - Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment 2018.
- B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size 2017, with Errata (2020).
- C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks 2020, with Errata and Amendments (2022).
- E. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings 2019.
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.
- I. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors current edition, including all revisions.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's installation instructions, product data, and engineering calculations.
- C. Closeout Submittals: Submit manufacturer's operation and maintenance instructions.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements for additional provisions.
 - 2. Extra Stock Materials: One set of filters.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

1.6 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

- B. **Manufacturer Warranty:** Provide 1-year manufacturer warranty for equipment including parts, materials, workmanship, and operation commencing on date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.
- C. **Motor Warranty:** Provide 36-month manufacturer warranty against breakdowns, malfunctions, or defects in material and workmanship under expected service conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Greenheck; [____]: www.greenheck.com/#sle.
- B. Munters Corporation; [____]: www.munters.com/#sle.
- C. RenewAire; [____]: www.renewaire.com/#sle.
- D. Ruskin Company; [____]: www.ruskin.com/#sle.

2.2 ENERGY RECOVERY VENTILATOR

- A. **ERV Equipment Construction Requirements:**
 - 1. **Energy Recovery Exchanger Type:** Membrane plate.
 - 2. **Supply and Return Duct Connection Orientation:** As indicated on drawings.
 - 3. **Casing and Frame:**
 - a. **Frame:** Galvanized steel body or welded extruded aluminum tubular frame capable of supporting components and casings including integral base lifting holes.
 - b. **Double Wall Panels:** Minimum of 18 gauge, 0.040 inch galvanized steel.
 - c. **Doors:** Construct doors of same construction and thickness as wall panels. Include p-shaped extruded neoprene gasket, prop rod, chain with spring, exterior handle, and interior 3-point latching device. Label each door to identify equipment located within.
 - d. **Insulation Requirements:**
 - 1) **Mold Resistance:** "Pass" when tested in accordance with ASTM C1338.
 - 2) **Fungal Resistance:** No growth when tested in accordance with ASTM G21.
 - 3) **Bacteria Resistance:** No growth when tested in accordance with UL 181.
 - 4) **Flame spread index of 25 or less and maximum smoke developed index of 50.**
 - e. **Isolation and Sealing:** Form continuous, thermally isolated, weathertight seal between inner wall of panels and structural framing with closed cell PVC foam gasketing and seal seams to prevent job site caulking.
 - f. **Access Panels:** Provide access to components through a large, tightly sealed and easily removable hinged or screwed access panel.
 - g. **Finish:** Polyurethane enamel over weather-protected, corrosion-resistant assembly.
 - h. **Nameplate:** Permanent name plate listing manufacturer, model number, serial number, voltage with tolerance, and amp ratings mounted inside door near electrical panel.
 - 4. **Supply and Exhaust Fans:**
 - a. Provide separate non-overloading, statically and dynamically balanced, draw-through, forward curved centrifugal fan or fan-array for each air stream.
 - b. **Fan Motor:** Constant Speed, high efficiency, load matched, belt-driven, open drip proof, thermal overload protected TEFC motor with variable-sheave belt drive, and adjustable-removable motor-slide base. Size drives to 150 percent of load, minimum.
 - c. **Motor Bearings:** Permanently lubricated sealed ball bearings rated for not less than 200,000 hours of operation with accessible greased fittings.
 - 5. **Dampers and Louvers:**
 - a. **Service Ratings:** Up to 6 in-wc closed and 3,000 fpm when open.
 - b. **Frame:** Minimum of 20 gauge, 0.0359 inch galvanized steel channel with rear flange, prepunched mounting holes, and welded corner clips for maximum rigidity.

- c. Exhaust Damper: Parallel blade, barometric damper for exhaust air stream isolation.
 - d. Outdoor-Intake Louver: Parallel blade, for exhaust air stream isolation. Provide weatherhood with intake insect screen and mist eliminator.
6. Filter Sections:
- a. Outdoor-Intake and Exhaust Sides: 2 inch thick, pleated, MERV 13 filters, ASHRAE Std 52.2.
 - b. Filter Racks: Bolt-on rack constructed of aluminum with minimum size of 1/12 inch thick. Include hinged side access door and snap fasteners.
7. Vibration Isolation: Provide corrosion-resistant vibration isolation products for internal motors and other revolving parts. See Section 230548.
8. Electrical:
- a. 208 VAC, 3-phase with single-point power connection to nonfused main disconnect interlocked with control panel and other components.
 - b. Install internal wiring in accordance with NFPA 70 within flexible, liquid tight steel conduit.
9. Controls and Local Control Panel:
- a. Unit Controls: Factory supplied DDC with sensors, limit switches, and frost control.
 - b. Provide fused disconnect within local control panel with power supplies, transformers, terminal strip or terminal blocks for interface of field installed components.
 - c. Service Status: Provide both local and remote indication of sensor readings and status of safeties and other status items including power on, wheel-rotation alarm, outside-air loaded filter and exhaust-air loaded filter.
 - d. Provide temperature, humidity, dewpoint temperature, CO₂, and wheel rotation sensors.
10. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135 BACnet MS/TP.
11. Configuration: Adjust listed requirements in conformance with ASHRAE Std 90.1 I-P.
12. Certification: AHRI 1060 (I-P) labeled, include copy of published ratings for operating conditions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that structure is ready for installation including openings, ductwork, mechanical utilities, and electrical utilities.

3.2 INSTALLATION

- A. Install equipment in accordance with manufacturer's written installation instructions.
- B. Do not obstruct maintenance access to equipment piping, electrical conduit, or any other utility.
- C. Vibration Isolation: Provide corrosion-resistant equipment isolation products; see Section 230548.
- D. Electrical: Provide equipment raceway, wiring, and cables; see Section 260583.
- E. Coordinate installation and fire alarm system interface of system compatible duct-mounted smoke detectors and other appurtenances following NFPA 90A guidelines.
- F. Start system and adjust controls and equipment for satisfactory operation.
- G. Coordinate hardwired or software interfacing links to enable coordinate as minimum start-stop, occupied, unoccupied functions as well as specific schedules and setpoints functions with other DDC controls onboard airside systems serving common spaces; see Section 230923.

3.3 SYSTEM STARTUP

- A. Provide services of manufacturer's authorized representative to provide start up of unit.

3.4 CLEANING

- A. Clean filters, air plenums, interior and exposed-to-view surfaces prior to Substantial Completion.

3.5 CLOSEOUT ACTIVITIES

- A. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Training Reference: Operation and maintenance manual and additional training materials as required.
 - 2. Provide minimum of two hours of training.

END OF SECTION

**SECTION 238216
AIR COILS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water heating coils.

1.2 RELATED REQUIREMENTS

- A. Section 220719 - Plumbing Piping Insulation.
- B. Section 232114 - Hydronic Specialties.
- C. Section 233100 - HVAC Ducts and Casings: Installation of duct coils.

1.3 REFERENCE STANDARDS

- A. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.
- C. Shop Drawings: Indicate coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors.
- B. Protect coils from entry of dirt and debris with pipe caps or plugs.

PART 2 PRODUCTS

2.1 WATER HEATING COILS

- A. Tubes: 5/8 inch OD seamless copper or brass arranged in parallel or staggered pattern, expanded into fins, silver brazed joints.
- B. Fins: Aluminum or copper continuous plate type with full fin collars.
- C. Casing: Die formed channel frame of 16 gauge, 0.0598 inch galvanized steel with mounting holes on 3 inch centers. Provide tube supports for coils longer than 36 inches.
- D. Headers: Cast iron with tubes expanded into header.
- E. Testing: Air test under water to 200 psi for working pressure of 200 psi and 220 degrees F.
- F. Configuration: Drainable, with threaded plugs for drain and vent.
- G. Fin Spacing: 8 fins per inch.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's written instructions.
- B. Install in ducts and casings in accordance with SMACNA (DCS).
 - 1. Support coil sections independent of piping on steel channel or double angle frames and secure to casings.
 - 2. Arrange supports to avoid piercing drain pans.
 - 3. Provide airtight seal between coil and duct or casing.
- C. Protect coils to prevent damage to fins and flanges. Comb out bent fins.

- D. Install coils level. [_____] .
- E. Make connections to coils with unions and flanges.
- F. Hydronic Coils:
 - 1. Hydronic Coils: Connect water supply to leaving air side of coil (counterflow arrangement).
 - 2. Provide manual air vents at high points complete with stop valve.
 - 3. Ensure water coils are drainable and provide drain connection at low points.
- G. Insulate headers located outside air flow as specified for piping. Refer to Section 220719.

END OF SECTION

SECTION 260010
GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1 GENERAL**1.1 SCOPE OF WORK**

- A. The work included in this Contract is shown on the drawings and described in these specifications. It consists of furnishing all labor, material, services, supervision and connection of all systems shown and/or specified including the requirements of:
1. DIVISION 00 - BIDDING AND CONTRACT REQUIREMENTS
 2. DIVISION 1 - GENERAL REQUIREMENT
 3. DIVISION 26,27,28 - GENERAL REQUIREMENT
- B. Contractor is responsible to review and understand all drawings and all work of all trades to ensure a complete and thorough project.
- C. Provide all labor, tools, materials, equipment, coordination, and plans necessary for installation and proper operation of the electrical systems.
- D. Contract drawings and specifications are complementary and must be so used to ascertain all requirements of the work.

1.2 DEFINITIONS

- A. Provide, furnish, install, and furnish and install shall have the same meaning. That is, the Contractor shall purchase, transport to the site and install all required components of the work unless specifically stated otherwise in the contract documents.
- B. Wiring pertains to raceway, fittings, conductors, terminations, hangers, supports, etc. as required to form a complete system.

1.3 DRAWINGS AND SPECIFICATIONS

- A. The plans are diagrammatic and indicate only the sizes and general arrangement of conduit, devices, and equipment; exact locations of all elements shall be determined as work progresses, in cooperation with the work of other trades. It is not intended to show every item of work or minor piece of equipment, but every item shall be furnished and installed without additional remuneration as necessary to complete the system in accordance with the best practice of the trade.
- B. As previously stated, the exact locations of electrical devices and equipment are diagrammatic. The owner may request for any devices or equipment to be installed at different locations than what is indicated on the drawings in a specific area or room. It is the responsibility of the Electrical Contractor to coordinate the locations of devices in all areas prior to installation.

1.4 PRODUCT EQUIVALENTS

- A. Where, in these specifications or on drawings, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as required standard of quality. Where two or more are named these are presumed to be equal, and Contractor may select one of those items.
- B. If Contractor desires to use any kind, type, brand, or manufacturer of material other than those named in specification, he may submit the request for approval to the Architect well in advance of the bid date.
- C. Requests for approval of proposed equivalents will be received by Architect only from the Contractor.
- D. If the Architect approves a proposed equivalent prior to receipt of Bids, such approval will be set forth in an Addendum.
- E. After the bid opening the apparent low bidder or bidders will be notified by the Architect or Owner and shall submit to the Architect in writing, within ten (10) calendar days what equivalent kind,

type, brand, or manufacture is included in bid in lieu of specified items. No equivalents will be considered after this submission.

- F. Contractor shall have burden of proving, at Contractor's own cost and expense, to satisfaction of Owner/Architect, that proposed product is similar and equal to named product. In making such determination Owner/Architect will be sole judge of objective and appearance criteria that proposed product must meet in order for it to be approved.
1. Supporting data on equivalency is responsibility of bidder. For each equivalent to base specification, included in products list, submit information describing in specific detail:
 - a. Wherein it differs from quality and performance required by base specification.
 - b. Changes required in other elements of work because of equivalent.
 - c. Effect on construction schedule.
 - d. Any required license fees or royalties.
 - e. Availability of maintenance service, and source of replacement materials.
 - f. Such other information as may be required by Owner.
- G. Owner, through Architect, shall be judge of acceptability of proposed equivalents. Risk of whether bid equivalents will be accepted is borne by Contractor.
- H. Submission of an equivalent product and/or material constitutes a representation that Contractor:
1. Has investigated proposed product and determined it is equal to or superior in all respects to that specified.
 2. Will provide same warranties or bonds for equivalent as for product specified.
 3. Will coordinate installation of an accepted equivalent into work and make such other changes as may be required to make work complete in all respects.
 4. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
 5. Will provide, at own cost and expense, any different quantity and/or arrangement of ductwork, piping, wiring, conduit or any part of work from that specified, detailed or indicated in Contract Documents if required for proper installation of an approved equivalent.
 6. Will provide, at own cost and expense, all such revision and redesign and all new drawings and details required by Architect for approval if proposed equivalent product requires a revision or redesign of any part of work covered by this contract.
- I. Contractor must sign the "Equivalent Certification" following this specification section and deliver it to the Architect along with a complete list of proposed equivalents within ten (10) calendar days after notification from the Architect or Owner. This is mandatory and must be done prior to award of contracts.

1.5 APPLICABLE STANDARDS

- A. All equipment shall bear the UL label.
- B. The latest edition of the following minimum standards shall apply wherever applicable:
1. American Standards Association
 2. American Society for Testing Materials
 3. Electrical Testing Laboratories, Inc.
 4. Institute of Electrical and Electronic Engineers
 5. Insulated Power Cable for Engineers Association
 6. Occupational Safety and Health Act
 7. National Electric Code
 8. National Electrical Manufacturers Association
 9. National Electrical Safety Code
 10. National Fire Protection Association
 11. Underwriters Laboratories, Inc.

- 12. Power company standards and regulations.
- 13. Local and state codes.

C. In the event there are conflicts between specifications and standards, standards shall govern unless specifications are in excess of standards.

1.6 PERMITS AND INSPECTIONS

- A. Permits: The Contractor shall apply for and pay the cost for any local permits necessary for the work of this contract.
- B. Inspections: The Contractor shall be responsible for obtaining a 3rd party electrical inspection of and the certificate by the approved inspection agency for the entire electrical system.
- C. The undertaking of periodic inspections by the Owner or Engineer shall not be construed as supervision of actual construction. The Owner or Engineer is not responsible for providing a safe place of work for the Contractor, Contractor's employees, suppliers or subcontractors for access, visits, use, work, travel or occupancy by any person.

1.7 CODES AND REGULATIONS

- A. Comply with all applicable rules and regulations of the municipal laws and ordinances and latest revisions thereof. All work shall be done in full conformity with the requirements of all authorities having jurisdiction. Modifications required by the above authorities will be made without additional charges to the Owner. Where alterations to and/or deviations from the Contract Documents are required by the authorities, report the requirements to the Engineer and secure approval before work is started.
- B. Furnish and file with the proper authorities, all drawings required by them in connection with the work. Obtain all permits, licenses, and inspections and pay all legal and proper fees and charges in this connection.
- C. Should any work shown or specified be of lighter or smaller material than Code requires, same shall be executed in strict accordance with the regulations.
- D. Heavier or larger size material than Code requires shall be furnished and installed, if required by the Plans and Specifications.
- E. This Contractor shall have the electrical work inspected from time to time by authorized inspectors and shall pay all expense incurred by same. At the completion of the work, the Contractor shall furnish a Certificate of Approval, in triplicate, indicating full approval of the work furnished and installed in this Contract from the local authority having jurisdiction.
- F. Equipment and components parts thereof shall bear manufacturer's name-plate, giving manufacturer's name, size, type and model number or serial number, electrical characteristic to facilitate maintenance and replacements. Name plates of distributors or contractors are not acceptable.
- G. Engineer will have privilege of stopping any work or use of any material that in his opinion is not being properly installed and each Contractor shall remove all materials delivered, or work erected, which does not comply with Contract Drawings and Specifications, and replace with proper materials, or correct such work as directed by the Engineer, at no additional cost to Owner.
- H. If equipment or materials are installed before proper approvals have been obtained, each Contractor shall be liable for their removal and replacement including work of other trades affected by such work, at no additional cost to Owner, if such items do not meet intent of the Drawings and Specifications.

1.8 RECORD DRAWINGS

- A. The Electrical Contractor shall keep an accurate location record of all underground and concealed piping, and of all changes from the original design. He is required to furnish this information to the

Engineer prior to his application for final payment.

1. Submit prior to final acceptance inspection, one complete marked-up set of reproducible engineering design drawings.
 - a. Fully illustrate all revisions made by all crafts in course of work.
 - b. Include all field changes, adjustments, variances, substitutions and deletions, including all Change Orders.
 - c. Exact location of raceways, equipment and devices.
 - d. Exact size and location of underground and under floor raceways, grounding conductors and duct banks.
 - e. These drawings shall be for record purposes for Owner's use and are not considered shop drawings.
- B. At completion of the project, all changes and deviations from the Contract Documents shall be recorded by the Contractor.
- C. Four (4) corrected sets of all operating and maintenance instructions and complete parts lists bound in hard covers shall be furnished to the Owner.

1.9 SLEEVES

- A. Sleeves: furnished, set in Electrical Work; built-in under General Construction Work.
- B. Sleeves shall be as follows:
 1. Sleeves in floors and partitions shall be galvanized steel with lock seam joints or a manufactured conduit floor seal.
 2. Sleeves of extra heavy cast iron pipe or galvanized steel pipe shall be used in outside walls, foundations, and footing or manufactured compression-type wall seal (waterproof).
 3. Conduit sleeves shall be two (2) sizes larger than the conduit passing through it.
 4. Terminate sleeves flush with walls, partitions, and ceilings. Sleeves in floor shall terminate 1/4" above floors.
 5. Fill space between sleeve and conduit in foundation walls with oakum and caulk with lead on both sides of wall. When using pipe sleeves, fill space between sleeve and pipe with fiberglass blanket insulation when sleeve does not occur in a foundation wall.
 6. An approved fire stop seal shall be used when conduits penetrate fire stopping walls and floors (between fire zone).
- C. Set sleeves, obtain review of their locations in ample time to permit pouring of concrete or progressing of other construction work as scheduled.

1.10 CLEANING CONDUIT, EQUIPMENT

- A. Conduit, equipment: thoroughly cleaned of dirt, cuttings, other foreign substances. Should any conduit, other part of systems be stopped by any foreign matter, disconnect, clean wherever necessary for purpose of locating, removing obstructions. Repair work damaged in course of removing obstructions.

1.11 VIBRATION ISOLATION

- A. Vibration isolators shall prevent, as far as practicable, transmission of vibration, noise or hum to any part of building.
- B. Design isolators to suit vibration frequency to be absorbed; provide isolator units of area, distribution to obtain proper resiliency under machinery load, impact.
- C. Wiring and other electrical connections to equipment mounted on vibration isolators; made flexible with minimum 180 degree loop of "greenfield" in order to avoid restraining equipment and short circuiting vibration isolator.

1.12 BALANCED LOAD

- A. It is intended that design and features of the work as indicated will provide balanced load on the feeders and main service. Contractor shall provide material and installation to provide this balance load insofar as possible.
- B. Contractor shall take current and voltage measurements at all panels of at least 1/2 hour. Reconnections of loads shall be made when deemed necessary by the Engineers.

1.13 JOB CONDITIONS

- A. Examine site related work and surfaces before starting work of any Section. Failure to do so shall in no way relieve the Contractor of the responsibility to properly install the new work.
 - 1. Report to the Engineer, in writing, conditions, which will prevent proper provision of this work ten (10) days prior to bid date, in time for an addendum to be issued .
 - 2. Beginning work of any Section without reporting unsuitable conditions to the Engineer constitutes acceptance of conditions by the Contractor.
 - 3. Perform any required removal, repair or replacement of this work caused by unsuitable conditions at no additional cost to Owner.
 - 4. The Contractor is responsible for performing routine maintenance and cleaning of any existing equipment where he is making connections to new work and to the building where his work adds debris.
- B. Connections to existing work:
 - 1. Install new work and connect to existing work with minimum interference to existing facilities.
 - 2. Provide temporary shutdowns of existing services only with written consent of Owner at no additional charges and at time not to interfere with normal operation of existing facilities.
 - 3. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
 - 4. Do not interrupt alarm and emergency systems.
 - 5. Connect new work to existing work in neat and acceptable manner.
 - 6. Restore existing disturbed work to original condition including maintenance of wiring and continuity as required. Replace damaged or rusted conduit to which new equipment is being installed and connected.
- C. Removal and relocation of existing work.
 - 1. Disconnect, remove or relocate electrical material, equipment and other work noted and required by removal or changes in existing construction.
 - 2. Provide new material and equipment required for relocated equipment.
 - 3. Disconnect load and line end of conductors feeding existing equipment.
 - 4. Remove conductors from existing raceways to be rewired.
 - 5. Remove conductors and cap outlets on raceways to be abandoned.
 - 6. Cut and cap abandoned floor raceways flush with concrete floor or behind walls and ceilings.
 - 7. Dispose of removed raceways and wire.
 - 8. Dispose of removed electrical equipment as directed by Owner. The Owner shall provide a list of equipment of the Contractor of equipment to be delivered to the Owner.

1.14 SPECIAL TOOLS AND LOOSE ITEMS

- A. Furnish to Owner at completion of work:
 - 1. One set of any special tools required to operate, adjust, dismantle or repair equipment furnished under any section of this Division.
 - 2. "Special Tools": Those not normally found in possession of mechanics or maintenance personnel.
 - 3. Keys
 - 4. Redundant components and spare parts.

- B. Deliver items to Owner and obtain receipt prior to approval of final payment.

1.15 REVIEW OF CONSTRUCTION

- A. Work may be reviewed at any time by representative of the Engineer.
- B. Advise Architect and Engineer that work is ready for review at following times:
1. Prior to backfilling buried work.
 2. Prior to concealment of work in walls and above ceilings.
 3. When all requirements of contract have been completed.
- C. Neither backfill nor conceal work without Engineer's consent.

1.16 SHOP DRAWING SUBMITTALS

- A. Submit required shop drawings, samples and product information in accordance with Division 1, requirements and as required in the various sections of these specifications.
- B. Submittals shall show evidence of checking by the Contractor for accuracy. Product information (catalog sheets) shall indicate complete catalog number, color, accessories, etc., as well as, name of manufacturer and local distributor or manufacturer's representative.
- C. Submit for review detailed coordination drawings 3/8" or larger scale plans for all major electrical equipment and any areas of conflicts by drafting location of equipment, lighting fixtures, cable trays and conduits larger than 1-1/2" trade size. Contractor shall refer to Division 1 for preparing coordination drawings.
- D. Incomplete submittals will be rejected.
- E. Additionally, the Contractor will submit data on the following:
1. All electrical equipment including all panelboards and switching devices (disconnects, switches, occupancy sensors, etc.).
 2. Fire stop seals used for wall penetrations.
 3. Any proposed variation in specified wiring plans and circuitry.
 4. All special items and panels, made or constructed specifically for this project, including wiring diagrams, component layout and component data or materials list.
 5. All settings of installed equipment, such as overcurrent protection, overload settings, temperature settings, time settings, etc. This includes equipment provided by other contractors or subcontractors and connected and tested by this Contractor.
- F. All submittals of NON SPECIFIED equipment and components will be reviewed. It is the submitting Contractor's responsibility to prove compliance and not the Architect/Engineer to prove non-compliance. The submitting Contractor will be charged the prevailing wage of the reviewing Engineer for all submittals requiring over one (1) hour to review that were not originally specified.
- G. It is the Contractor's responsibility to provide submittals in an organized and timely manner so as not to delay the project schedule and hamper the work of other trades.

1.17 OPERATING INSTRUCTIONS

- A. It shall be the Contractor's responsibility to insure that the Owner's representative is given adequate instruction on the operation of all equipment prior to final payment.

1.18 TEMPORARY POWER

- A. The Contractor shall provide all temporary power to all trades throughout all phases of construction throughout the duration of this project. This will include but not be limited to temporary lighting, power outlets, temporary elevator operation, controls for temporary heating, and job trailers. Contractor shall be responsible for providing temporary power via adjacent building(s) and/or a temporary diesel fired generator and associated fuel costs. Contractor shall coordinate temporary power source with project manager prior to demolition. Contractor is responsible for all costs

associated with temporary power.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials and equipment shall be new and as specified or of equal or better quality.
- B. Basic hardware and miscellaneous items shall meet existing trade standards of quality and shall carry UL or FM listings where applicable.
- C. All equipment supplied shall be the standard equipment of the manufacturer.
- D. Multiple items such as panelboards, wiring devices, switches, breakers, raceways, etc., shall be from the same manufacturer.
- E. Drawings and specifications are based on specific manufacturer's equipment. Therefore, the Contractor shall assume all responsibility, cost and coordination involved in making any necessary revisions to apply another manufacturer's equipment, even though it may be approved as an "equal" item by the Engineer.

PART 3 EXECUTION

3.1 COORDINATION OF WORK

- A. All work shall be executed in accordance with recognized standards of workmanship. All work shall be installed in a neat and orderly manner.
- B. The Contractor shall exchange information with other Contractors and the Owner in order to insure orderly progress of the work.
- C. The Contractor must contact the Owner's representative and schedule all work ten (10) days prior to start.
- D. The Contractor shall check for possible interference before installing any items. If any work is installed, and later develops interference with other features of the design, the Contractor will be responsible to make such changes to eliminate the interference.

3.2 CEILING REMOVAL

- A. Existing ceilings which must be removed for the installation of new work or demolition of existing conditions shall be done by the Contractor. No ceiling shall be removed without prior approval of the Owner. Ceilings which must be removed shall be restored to their original condition as soon as practical and prior to final payment.
- B. The removed tile of lay-in type ceilings shall be stored either in the ceiling space or at a designated space in the building. No tiles shall be stored in the occupied space.
- C. The Contractor shall take all necessary precautions to prevent damage to the existing ceilings. All damaged ceilings shall be replaced with new ceiling construction to match the existing and to the Owner's satisfaction.

END OF SECTION

**SECTION 260505
SELECTIVE DEMOLITION FOR ELECTRICAL****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Electrical demolition.

PART 2 PRODUCTS**2.1 MATERIALS AND EQUIPMENT**

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Report discrepancies to Architect before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- C. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.
- D. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Notify Owner before partially or completely disabling system.
 - 2. Make notifications at least 24 hours in advance.
 - 3. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
 - 1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
 - 2. PCB- and DEHP-containing lighting ballasts.
 - 3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.

- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.4 CLEANING AND REPAIR

- A. See Section 017419 - Construction Waste Management and Disposal for additional requirements.
- B. Clean and repair existing materials and equipment that remain or that are to be reused.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Heat shrink tubing.
- E. Oxide inhibiting compound.
- F. Wire pulling lubricant.
- G. Cable ties.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- C. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape 2017.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2021.
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 260526.
- H. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- I. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- J. Minimum Conductor Size: 12 AWG.
- K. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- L. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.
 - d. Isolated Ground, All Systems: Green with yellow stripe.
 - e. Travelers for 3-Way and 4-Way Switching: Pink.
 - f. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
 - g. For control circuits, comply with manufacturer's recommended color code.

2.3 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation; [____]: www.generalcable.com/#sle.
 - d. Service Wire Co: www.servicewire.com/#sle.
 - e. Southwire Company: www.southwire.com/#sle.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.4 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

2.5 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
 - 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
 - 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
 - 5. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
 - 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Burndy LLC; [____]: www.burndy.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
 - 1. Manufacturers:
 - a. Burndy LLC; [____]: www.burndy.com/#sle.

16128.00

LOW-VOLTAGE ELECTRICAL
POWER CONDUCTORS AND
CABLES

260519 - 5

- b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. Ilsco: www.ilsco.com/#sle.
- D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. American Polywater Corporation: www.polywater.com/#sle.
 - c. Ideal Industries, Inc: www.idealindustries.com/#sle.
- E. Cable Ties: Material and tensile strength rating suitable for application.
- 1. Manufacturers:
 - a. Burndy LLC; [_____]: www.burndy.com/#sle.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
 - 4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 - 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 - 6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 - 7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - 8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

16128.00

LOW-VOLTAGE ELECTRICAL
POWER CONDUCTORS AND
CABLES

260519 - 6

- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 - 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
 - 2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- G. Install conductors with a minimum of 12 inches of slack at each outlet.
- H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- K. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
 - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
- M. Insulate ends of spare conductors using vinyl insulating electrical tape.
- N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- O. Identify conductors and cables in accordance with Section 260553.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

LOW-VOLTAGE ELECTRICAL
POWER CONDUCTORS AND
CABLES

- Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
- D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground rod electrodes.

1.2 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 467 - Grounding and Bonding Equipment Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS**2.1 GROUNDING AND BONDING REQUIREMENTS**

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

- E. Grounding Electrode System:
 - 1. Metal Underground Water Pipe(s):
 - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
 - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
 - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
 - 2. Metal In-Ground Support Structure:
 - 3. Concrete-Encased Electrode:
 - 4. Ground Rod Electrode(s):
 - a. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
- F. Service-Supplied System Grounding:
 - 1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
 - 2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- G. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
 - 7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
 - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
 - b. Metal gas piping.
 - 8. Provide bonding for interior metal air ducts.
 - 9. Provide bonding for metal building frame.

2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.

- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
 - 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 - 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 - 3. Unless otherwise indicated, use mechanical connectors or exothermic welded connections for accessible connections.
 - a. Exceptions:
 - 1) Use exothermic welded connections for connections to metal building frame.
 - 4. Manufacturers - Mechanical and Compression Connectors:
 - a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
 - b. Burndy LLC: www.burndy.com/#sle.
 - c. Harger Lightning & Grounding: www.harger.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
 - 5. Manufacturers - Exothermic Welded Connections:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.
 - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com/#sle.
 - 6. Manufacturers:
 - a. Advanced Lightning Technology (ALT); [_____]: www.altfab.com/#sle.
 - b. Erico International Corporation; [_____]: www.erico.com/#sle.
 - c. Galvan Industries, Inc; [_____]: www.galvanelectrical.com/#sle.
 - d. Harger Lightning & Grounding; [_____]: www.harger.com/#sle.
 - e. Advanced Lightning Technology (ALT); [_____]: www.altfab.com/#sle.
 - f. Erico International Corporation; [_____]: www.erico.com/#sle.
 - g. Harger Lightning & Grounding; [_____]: www.harger.com/#sle.
 - h. thermOweld, subsidiary of Continental Industries; division of Burndy LLC; [_____]: www.thermoweld.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70.

1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
- D. Make grounding and bonding connections using specified connectors.
1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.
- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.1 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- C. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- D. Section 265100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- D. MFMA-4 - Metal Framing Standards Publication 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

PART 2 PRODUCTS**2.1 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported at 5 times the applied force. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
 - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel.

2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
 1. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
 1. Comply with MFMA-4.
 2. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation; [_____]: www.cooperindustries.com/#sle.
 - b. Thomas & Betts Corporation; [_____]: www.tnb.com/#sle.
 - c. Unistrut, a brand of Atkore International Inc; [_____]: www.unistrut.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
 - e. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch diameter.
 - b. Busway Supports: 1/2 inch diameter.
 - c. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
 - d. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
 - e. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
 - f. Outlet Boxes: 1/4 inch diameter.
 - g. Luminaires: 1/4 inch diameter.
- F. Anchors and Fasteners:
 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 2. Concrete: Use preset concrete inserts or expansion anchors.
 3. Solid or Grout-Filled Masonry: Use expansion anchors.
 4. Hollow Masonry: Use toggle bolts.
 5. Hollow Stud Walls: Use toggle bolts.
 6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 7. Sheet Metal: Use sheet metal screws.
 8. Plastic and lead anchors are not permitted.
 9. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Comply with MFMA-4.
 - b. Channel Material: Use galvanized steel.
 - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 4 inch high concrete pad constructed in accordance with Section 033000.
 - 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: Also comply with Section 260533.13.
- I. Box Support and Attachment: Also comply with Section 260533.16.
- J. Interior Luminaire Support and Attachment: Also comply with Section 265100.
- K. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- L. Secure fasteners according to manufacturer's recommended torque settings.
- M. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Electrical metallic tubing (EMT).
- E. Conduit fittings.
- F. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 078400 - Firestopping.
- C. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- D. Section 260529 - Hangers and Supports for Electrical Systems.
- E. Section 260548 - Vibration and Seismic Controls for Electrical Systems.
- F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2020.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2013.
- E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) 2017.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.
- I. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
- J. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.
- K. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations Current Edition, Including All Revisions.
- L. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Shop Drawings:
 1. Include proposed locations of roof penetrations and proposed methods for sealing.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).
- D. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).
- E. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- F. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).
- G. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
- H. Exposed, Exterior: Use galvanized steel rigid metal conduit.
- I. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.
- J. Hazardous (Classified) Locations: Use galvanized steel rigid metal conduit.
- K. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
 1. Maximum Length: 6 feet.
- L. Connections to Vibrating Equipment:
 1. Dry Locations: Use flexible metal conduit.
 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
 3. Maximum Length: 6 feet unless otherwise indicated.

- 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.

M. Fished in Existing Non-Accessible Walls, Where Necessary: Use flexible metal conduit.

2.2 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Fittings for Grounding and Bonding: Also comply with Section 260526.
- C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4 inch (21 mm) trade size.
 - 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
 - 3. Control Circuits: 1/2 inch (16 mm) trade size.
 - 4. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 - 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 - 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
 - 2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
 - 4. Material: Use steel.
 - 5. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.4 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. International Metal Hose: www.metalhose.com/#sle.

- 4. Substitutions: See Section 016000 - Product Requirements.
- B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. International Metal Hose: www.metalhose.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.6 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular/#sle.
 - 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 - 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel.
 - 4. Connectors and Couplings: Use set-screw type.
 - a. Do not use indenter type connectors and couplings.
 - 5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
 - 6. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.7 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. International Metal Hose: www.metalhose.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

2.8 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.
- F. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- G. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.
- H. Duct Bank Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for concrete encasement in open trench installation; suitable for the conduit/duct arrangement to be installed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- E. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal all conduits unless specifically indicated to be exposed.
 - 4. Conduits in the following areas may be exposed, unless otherwise indicated:

- a. Electrical rooms.
- b. Mechanical equipment rooms.
- c. Within joists in areas with no ceiling.
- 5. Unless otherwise approved or indicated on associated documents, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.
 - c. Across top of parapet walls.
 - d. Across building exterior surfaces.
- 6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
- 7. Conduits run within slab on deck applications are NOT acceptable.
- 8. Arrange conduit to maintain adequate headroom, clearances, and access.
- 9. Arrange conduit to provide no more than the equivalent of three 90 degree bends between pull points.
- 10. Arrange conduit to provide no more than 150 feet between pull points.
- 11. Route conduits above water and drain piping where possible.
- 12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
- 13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
- F. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide required vibration isolation and/or seismic controls in accordance with Section 260548.
 - 3. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 4. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 - 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 - 7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
 - 8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
 - 9. Use of spring steel conduit clips for support of conduits is not permitted.
 - 10. Use of wire for support of conduits is not permitted.
 - 11. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.
- G. Connections and Terminations:
 - 1. Use approved conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs for dry locations and raintight hubs for wet locations.
 6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- H. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- I. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 033000 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.
- J. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where conduits are subject to earth movement by settlement or frost.
- K. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- L. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- M. Provide grounding and bonding in accordance with Section 260526.
- N. Identify conduits in accordance with Section 260553.
- 3.3 FIELD QUALITY CONTROL**
- A. See Section 014000 - Quality Requirements, for additional requirements.

- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Floor boxes.

1.2 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 083100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 262726 - Wiring Devices:
 - 1. Wall plates.
 - 2. Floor box service fittings.
 - 3. Additional requirements for locating boxes for wiring devices.
- G. Section 271000 - Structured Cabling: Additional requirements for communications systems outlet boxes.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013 (Reaffirmed 2020).
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports 2013 (Reaffirmed 2020).
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- J. UL 508A - Industrial Control Panels Current Edition, Including All Revisions.
- K. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS**A. Coordination:**

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
- C. Samples:
 1. Floor Boxes: Provide one sample(s) of each floor box proposed for substitution upon request.
- D. Project Record Documents: Record actual locations for pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 016000 - Product Requirements, for additional provisions.
 2. Keys for Lockable Enclosures: Two of each different key.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS**2.1 BOXES****A. General Requirements:**

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled as suitable for the purpose intended.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
 4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
 5. Use suitable concrete type boxes where flush-mounted in concrete.
 6. Use suitable masonry type boxes where flush-mounted in masonry walls.
 7. Use raised covers suitable for the type of wall construction and device configuration where required.
 8. Use shallow boxes where required by the type of wall construction.
 9. Do not use "through-wall" boxes designed for access from both sides of wall.
 10. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 11. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 12. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 13. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 14. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 15. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch by 2-1/8 inches by 2-1/8 inches deep unless otherwise noted.
 - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
 - c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
 16. Wall Plates: Comply with Section 262726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 - b. Boxes 6 square feet and Larger: Provide hinged-cover enclosures.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
 5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
- D. Floor Boxes:
1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 262726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
 2. Use cast iron floor boxes within slab on grade.
 3. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).

4. Manufacturer: Same as manufacturer of floor box service fittings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:
 1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
 2. Unless dimensioned, box locations indicated are approximate.
 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 - b. Communications Systems Outlets: Comply with Section 271000.
 4. Locate boxes so that wall plates do not span different building finishes.
 5. Locate boxes so that wall plates do not cross masonry joints.
 6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
 7. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 8. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
- I. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

- J. Install boxes plumb and level.
 - K. Flush-Mounted Boxes:
 - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
 - L. Floor-Mounted Cabinets: Mount on properly sized 4 inch high concrete pad constructed in accordance with Section 033000.
 - M. Install boxes as required to preserve insulation integrity.
 - N. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.
 - O. Nonmetallic Floor Boxes: Cut box flush with finished floor after concrete pour.
 - P. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
 - Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
 - R. Close unused box openings.
 - S. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
 - T. Provide grounding and bonding in accordance with Section 260526.
 - U. Identify boxes in accordance with Section 260553.
- 3.3 CLEANING**
- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.
- 3.4 PROTECTION**
- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Warning signs and labels.

1.2 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting.
- B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- C. Section 260573 - Power System Studies: Arc flash hazard warning labels.
- D. Section 262726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.
- E. Section 271000 - Structured Cabling: Identification for communications cabling and devices.

1.3 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs 2011 (Reaffirmed 2017).
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels 2011 (Reaffirmed 2017).
- C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 969 - Marking and Labeling Systems Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
 - 2. Do not install identification products until final surface finishes and painting are complete.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- C. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.
- D. Samples:
 - 1. Identification Nameplates: One of each type and color specified.
 - 2. Warning Signs and Labels: One of each type and legend specified.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Adhesive-attached labeling materials, including label stocks, laminating adhesive, and inks used by label printers, shall comply with UL 969.

PART 2 PRODUCTS**2.1 IDENTIFICATION REQUIREMENTS**

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces.
 - 6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - b. Enclosed switches, circuit breakers, and motor controllers:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
 - c. Enclosed Contactors:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify configuration, e.g., E.O.E.H. (electrically operated, electrically held) or E.O.M.H. (electrically operated, mechanically held).
 - 4) Identify coil voltage.
 - 5) Identify load(s) and associated circuits controlled. Include location.
 - 2. Emergency System Equipment:
 - a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
 - b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.
 - c. Use identification nameplate to identify emergency operating instructions for emergency system equipment.
 - 3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.
 - 4. Use identification nameplate to identify equipment utilizing series ratings, where permitted, in accordance with NFPA 70.
 - 5. Use identification nameplate to identify switchboards and panelboards utilizing a high leg delta system in accordance with NFPA 70.
 - 6. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.

7. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
 8. Use identification label or handwritten text using indelible marker on inside of door at each motor controller to identify nameplate horsepower, full load amperes, code letter, service factor, voltage, and phase of motor(s) controlled.
 9. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
 10. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
 - a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches wide, painted in accordance with Section 099123 and 099113.
 11. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
 12. Arc Flash Hazard Warning Labels: Comply with Section 260573.
 13. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
 14. Use warning signs to identify electrical hazards for entrances to all buildings, vaults, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".
 15. Use warning labels to identify electrical hazards for equipment, compartments, and enclosures containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".
 16. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.
- B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
 2. Identification for Communications Conductors and Cables: Comply with Section 271000.
 3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
 4. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
 - a. At each source and load connection.
 - b. Within boxes when more than one circuit is present.
 - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
 - d. In cable tray, at maximum intervals of 20 feet.
 5. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.
 6. Use underground warning tape to identify direct buried cables.

- C. Identification for Raceways:
1. Use voltage markers to identify highest voltage present for accessible conduits 3" high at maximum intervals of 20 feet.
 2. Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet.
 - a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches wide.
 - 1) Color Code:
 - (a) Emergency Power System: Red.
 - (b) Fire Alarm System: Red.
 - 2) Field-Painting: Comply with Section 099123 and 099113.
 - 3) Vinyl Color Coding Electrical Tape: Comply with Section 260519.
 3. Use identification labels to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.
 4. Use identification labels to identify spare conduits at each end. Identify purpose and termination location.
 5. Use underground warning tape to identify underground raceways.
 6. Use voltage markers to identify highest voltage present for wireways at maximum intervals of 20 feet.
- D. Identification for Cable Tray: Comply with Section 260536.
- E. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.
 2. Use voltage markers or color coded boxes to identify systems other than normal power system.
 - a. Color-Coded Boxes: Field-painted in accordance with Section 099123 and 099113 per the same color code used for raceways.
 - 1) Emergency Power System: Red.
 - b. For exposed boxes in public areas, do not color code.
 3. Use identification labels to identify circuits enclosed.
 - a. For exposed boxes in public areas, use only identification labels.
 4. Use warning labels to identify electrical hazards for boxes containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".
- F. Identification for Devices:
1. Identification for Communications Devices: Comply with Section 271000.
 2. Wiring Device and Wallplate Finishes: Comply with Section 262726.
 3. Factory Pre-Marked Wallplates: Comply with Section 262726.
 4. Use identification label to identify fire alarm system devices.
 - a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.
 5. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
- G. Identification for Luminaires:
1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.
- H. Identification for Photovoltaic Systems: Comply with Section 263100

2.2 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 - a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - a. Use only for indoor locations.
 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
 2. Legend:
 - a. System designation where applicable:
 - 1) Emergency Power System: Identify with text "EMERGENCY".
 - 2) Fire Alarm System: Identify with text "FIRE ALARM".
 - b. Equipment designation or other approved description.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height:
 - a. System Designation: 1 inch.
 - b. Equipment Designation: 1/2 inch.
 - c. Other Information: 1/4 inch.
 - d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
 5. Color:
 - a. Normal Power System: White text on black background.
 - b. Emergency Power System: White text on red background.
- D. Format for General Information and Operating Instructions:
1. Minimum Size: 1 inch by 2.5 inches.
 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: 1/4 inch.
 5. Color: Black text on white background unless otherwise indicated.
- E. Format for Caution and Warning Messages:
1. Minimum Size: 2 inches by 4 inches.
 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: 1/2 inch.

5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Fire Alarm Device Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Designation indicated and device zone or address.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Red text on white background.

2.3 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
 1. Do not use handwritten text.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.

2.4 VOLTAGE MARKERS

- A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.
- B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- C. Minimum Size:
 1. Markers for Equipment: 1 1/8 by 4 1/2 inches.
 2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
 3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
 4. Markers for Junction Boxes: 1/2 by 2 1/4 inches.
- D. Legend:
 1. Markers for Voltage Identification: Highest voltage present.
 2. Markers for System Identification:
 - a. Emergency Power System: Text "EMERGENCY".
- E. Color: Black text on orange background unless otherwise indicated.

2.5 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 1. Materials:
 - a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
 - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
 3. Minimum Size: 7 by 10 inches unless otherwise indicated.
- C. Warning Labels:
 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials

recognized to UL 969.

- a. Do not use labels designed to be completed using handwritten text.
 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 3. Minimum Size: 2 by 4 inches unless otherwise indicated.
- D. Floor Signs:
1. Materials: Use factory preprinted, self-adhesive vinyl, polyester, or rubber labels with protective overlamine; removable.
 2. Minimum Size: 17-inch diameter unless otherwise indicated.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
1. Surface-Mounted Equipment: Enclosure front.
 2. Flush-Mounted Equipment: Enclosure front.
 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 4. Elevated Equipment: Legible from the floor or working platform.
 5. Branch Devices: Adjacent to device.
 6. Interior Components: Legible from the point of access.
 7. Conduits: Legible from the floor.
 8. Boxes: Outside face of cover.
 9. Conductors and Cables: Legible from the point of access.
 10. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
- G. Secure rigid signs using stainless steel screws.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

**SECTION 260923
LIGHTING CONTROL DEVICES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Occupancy sensors.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 262726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, and fan speed controllers.
 - 1. Includes finish requirements for wall controls specified in this section.
- F. Section 265100 - Interior Lighting.
- G. Section 265600 - Exterior Lighting.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.
- C. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices 2020.
- D. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 1472 - Solid-State Dimming Controls Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
 - 3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
 - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.
- B. Sequencing:
 - 1. Do not install lighting control devices until final surface finishes and painting are complete.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
 - 1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.
- C. Field Quality Control Reports.
- D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Operation and Maintenance Data: Include detailed information on device programming and setup.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.7 FIELD CONDITIONS

1.8 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.1 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.
- C. Products for Switching of Electronic Ballasts/Drivers: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.2 OCCUPANCY SENSORS

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Lutron Electronics Company, Inc: www.lutron.com/#sle.
 - 3. Sensor Switch Inc: www.sensorswitch.com/#sle.
 - 4. WattStopper: www.wattstopper.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
 - 6. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.
- B. All Occupancy Sensors:
 - 1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
 - 2. Sensor Technology:
 - a. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
 - 3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
 - 4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
 - 5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
 - 6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
 - 7. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
 - 8. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
 - 9. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on drawings.

- C. Wall Switch Occupancy Sensors:
 - 1. All Wall Switch Occupancy Sensors:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
 - b. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
 - c. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
 - 2. Passive Infrared/Ultrasonic Dual Technology Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet.
- D. Wall Dimmer Occupancy Sensors:
 - 1. General Requirements:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated dimming control capability , and no leakage current to load in off mode.
 - b. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
 - c. Dimmer: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, and listed as complying with UL 1472; type and rating suitable for load controlled.
 - d. Finish: Match finishes specified for wiring devices in Section 262726, unless otherwise indicated.
- E. Ceiling Mounted Occupancy Sensors:
 - 1. All Ceiling Mounted Occupancy Sensors:
 - a. Description: Low profile occupancy sensors designed for ceiling installation.
 - b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
 - c. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
 - d. Finish: White unless otherwise indicated.
 - 2. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:
 - a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
- F. Power Packs for Low Voltage Occupancy Sensors:
 - 1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
 - 2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
 - 3. Input Supply Voltage: Dual rated for 120/277 V ac.
 - 4. Load Rating: As required to control the load indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

- C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.
- F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.
- G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of lighting control devices provided under this section.
- C. Install lighting control devices in accordance with manufacturer's instructions.
- D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- E. Install lighting control devices plumb and level, and held securely in place.
- F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.
- G. Provide required supports in accordance with Section 260529.
- H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- I. Occupancy Sensor Locations:
 - 1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.
 - 2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.
- J. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.
- K. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each lighting control device for damage and defects.

- C. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.
- D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.5 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.
- C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

3.6 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 COMMISSIONING

- A. See Section 019113 - General Commissioning Requirements for commissioning requirements.

3.8 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals, for closeout submittals.
- B. See Section 017900 - Demonstration and Training, for additional requirements.

END OF SECTION

**SECTION 262416
PANELBOARDS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Lighting and appliance panelboards.
- B. Overcurrent protective devices for panelboards.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260548 - Vibration and Seismic Controls for Electrical Systems.
 - 1. Includes requirements for the seismic qualification of equipment specified in this section.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 260573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.
- F. Section 262813 - Fuses: Fuses for fusible switches and spare fuse cabinets.
- G. Section 264300 - Surge Protective Devices.

1.3 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service 2013e (Amended 2017).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- E. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts 2008 (Reaffirmed 2020).
- F. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum) 2013.
- G. NEMA PB 1 - Panelboards 2011.
- H. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less 2013.
- I. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- J. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- L. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- M. UL 67 - Panelboards Current Edition, Including All Revisions.
- N. UL 98 - Enclosed and Dead-Front Switches Current Edition, Including All Revisions.
- O. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures Current Edition, Including All Revisions.
- P. UL 869A - Reference Standard for Service Equipment Current Edition, Including All Revisions.
- Q. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.

- R. UL 1053 - Ground-Fault Sensing and Relaying Equipment Current Edition, Including All Revisions.
- S. UL 1699 - Arc-Fault Circuit-Interrupters Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
 - 4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 - 1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
 - 2. Include wiring diagrams showing all factory and field connections.
 - 3. Identify mounting conditions required for equipment seismic qualification.
- D. Manufacturer's equipment seismic qualification certification.
- E. Source Quality Control Test Reports: Include reports for tests designated in NEMA PB 1 as routine tests.
- F. Field Quality Control Test Reports.
- G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- I. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Panelboard Keys: Two of each different key.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperature within the following limits during and after installation of panelboards:
 - 1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
 - 2. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Eaton Corporation; [_____]: www.eaton.com/#sle.
- B. Schneider Electric; Square D Products; [_____]: www.schneider-electric.us/#sle.
- C. Substitutions: See Section 016000 - Product Requirements.
- D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Seismic Qualification: Provide panelboards and associated components suitable for application under the seismic design criteria specified in Section 260548 where required. Include certification of compliance with submittals.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
 - b. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.
- D. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating as indicated on the drawings.
 - 2. Listed series ratings are not acceptable.
- E. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- F. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- G. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- H. Bussing: Sized in accordance with UL 67 temperature rise requirements.

1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 2. Provide 200 percent rated neutral bus and lugs where indicated.
 3. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
 4. Provide separate isolated/insulated ground bus where indicated.
- I. Conductor Terminations: Suitable for use with the conductors to be installed.
- J. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R Type 3R and Type 4X as indicated on drawings
 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
 - c. Provide removable end walls for NEMA Type 1 enclosures.
 - d. Provide painted steel boxes for surface-mounted panelboards where exposed to public view, finish to match fronts.
 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 - c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.
 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- K. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- L. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 264300, list and label panelboards as a complete assembly including surge protective device.
- M. Panelboard Contactors: Where panelboard contactors are indicated, provide electrically operated, mechanically held magnetic contactor complying with NEMA ICS 2.
1. Ampere Rating: Not less than ampere rating of panelboard bus.
 2. Short Circuit Current Rating: Not less than the panelboard short circuit current rating.
 3. Coil Voltage: As required for connection to control system indicated.
- N. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
1. Where electronic circuit breakers equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.
 2. Where accessory ground fault sensing and relaying equipment is used, equip companion overcurrent protective devices with ground-fault shunt trips.
 - a. Use zero sequence ground fault detection method unless otherwise indicated.
 - b. Provide test panel and field-adjustable ground fault pick-up and delay settings.
- O. Provide the following features and accessories where indicated or where required to complete installation:
1. Feed-through lugs.
 2. Sub-feed lugs.

2.3 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
 - 2. Phase and Neutral Bus Material: Copper.
 - 3. Ground Bus Material: Copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
- E. Enclosures:
 - 1. Provide surface-mounted or flush-mounted enclosures as indicated.
 - 2. Fronts: Provide door-in-door trim with full lengthed piano hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 - 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. Fusible Switches:
 - 1. Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA KS 1, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.
 - 2. Fuse Clips: As required to accept indicated fuses.
 - a. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
 - 3. Provide externally operable handle with means for locking in the OFF position. Provide means for locking switch cover in the closed position. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
 - 4. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Copper, suitable for terminating copper conductors only.
- B. Molded Case Circuit Breakers:
 - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 - 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - 1) 22,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - 2) 25,000 rms symmetrical amperes at 480 VAC.
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 - 3. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Copper, suitable for terminating copper conductors only.

4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
 - a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
 - b. Provide interchangeable trip units where indicated.
5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
 - a. Provide the following field-adjustable trip response settings:
 - 1) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
 - 2) Long time delay.
 - 3) Short time pickup and delay.
 - 4) Instantaneous pickup.
 - 5) Ground fault pickup and delay where ground fault protection is indicated.
6. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
7. Provide the following circuit breaker types where indicated:
 - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
 - b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
 - c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
 - d. 100 Percent Rated Circuit Breakers: Listed for application within the panelboard where installed at 100 percent of the continuous current rating.
 - e. Current Limiting Circuit Breakers: Without using fusible elements, designed to limit the let-through energy to a value less than the energy of a one-half cycle wave of the symmetrical prospective current when operating within its current limiting range.
8. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
9. Provide the following features and accessories where indicated or where required to complete installation:
 - a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
 - b. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.
 - c. Auxiliary Switch: SPDT switch suitable for connection to system indicated for indicating when circuit breaker has tripped or been turned off.

2.5 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.

- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 260529.
- F. Install panelboards plumb.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.
- J. Provide grounding and bonding in accordance with Section 260526.
 - 1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
 - 2. Terminate branch circuit isolated grounding conductors on isolated/insulated ground bus only. Do not terminate on solidly bonded equipment ground bus.
- K. Install all field-installed branch devices, components, and accessories.
- L. Provide fuses complying with Section 262813 for fusible switches as indicated.
- M. Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 260573.
- N. Set field-adjustable ground fault protection pickup and time delay settings as indicated.
- O. Provide filler plates to cover unused spaces in panelboards.
- P. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:
 - 1. Fire detection and alarm circuits.
- Q. Identify panelboards in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- D. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than [_____] amperes. Tests listed as optional are not required.
- E. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
- F. Test GFCI circuit breakers to verify proper operation.
- G. Test AFCI circuit breakers to verify proper operation.
- H. Test shunt trips to verify proper operation.
- I. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.5 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

**SECTION 262726
WIRING DEVICES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Wall plates.

1.2 RELATED REQUIREMENTS

- A. Section 260533.16 - Boxes for Electrical Systems.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for 2014h, with Amendments (2017).
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification) 2014g, with Amendment (2017).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2020).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2016.
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.
- L. UL 1472 - Solid-State Dimming Controls Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
 - 3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.
- B. Sequencing:
 - 1. Do not install wiring devices until final surface finishes and painting are complete.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
 - 1. Wall Dimmers: Include derating information for ganged multiple devices.
- C. Operation and Maintenance Data:
 - 1. Wall Dimmers: Include information on operation and setting of presets.
 - 2. GFCI Receptacles: Include information on status indicators.
- D. Project Record Documents: Record actual installed locations of wiring devices.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
- D. Provide GFCI protection for receptacles installed within 6 feet of sinks.
- E. Provide GFCI protection for receptacles installed in kitchens.
- F. Provide GFCI protection for receptacles serving electric drinking fountains.
- G. Unless noted otherwise, do not use combination switch/receptacle devices.

2.2 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: White with stainless steel wall plate.
- C. Wiring Devices Installed in Finished Spaces: White with stainless steel wall plate.
- D. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover.

2.3 WALL SWITCHES

- A. Manufacturers:
 - 1. Hubbell Incorporated; [_____]: www.hubbell.com/#sle.
 - 2. Pass & Seymour, a brand of Legrand North America, Inc; [_____]: www.legrand.us/#sle.
- B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.4 WALL DIMMERS

- A. Wall Dimmers - General Requirements: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.
- B. Control: Slide control type with separate on/off switch.
- C. Power Rating, Unless Otherwise Indicated or Required to Control the Load Indicated on the Drawings:

2.5 RECEPTACLES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
 - 3. Hospital Grade Receptacles: Listed as complying with UL 498 Supplement SD, with green dot hospital grade mark on device face.
- C. Convenience Receptacles:
 - 1. Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 - 2. Weather Resistant Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
 - 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 - 2. Standard GFCI Receptacles: Commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 - 3. Weather Resistant GFCI Receptacles: Commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.6 WALL PLATES

- A. Manufacturers:
 - 1. Hubbell Incorporated; [_____]: www.hubbell-wiring.com/#sle.
 - 2. Pass & Seymour, a brand of Legrand North America, Inc; [_____]: www.legrand.us/#sle.
- B. Wall Plates: Comply with UL 514D.
 - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 - 2. Size: Standard.
 - 3. Screws: Metal with slotted heads finished to match wall plate finish.

- C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- D. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.
- E. Weatherproof Covers for Wet or Damp Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
 - 1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - 2. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
 - 3. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
 - 4. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install wall switches with OFF position down.

- J. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- K. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- O. Identify wiring devices in accordance with Section 260553.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch and wall dimmer with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.
- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust presets for wall dimmers according to manufacturer's instructions as directed by Architect.

3.6 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 262813
FUSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fuses.
- B. Spare fuse cabinet.

1.2 RELATED REQUIREMENTS

- A. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- B. Section 262413 - Switchboards: Fusible switches.
- C. Section 262419 - Motor-Control Centers: Fusible switches.
- D. Section 262513 - Low-Voltage Busways: Fusible switches.
- E. Section 262816.16 - Enclosed Switches: Fusible switches.

1.3 REFERENCE STANDARDS

- A. NEMA FU 1 - Low Voltage Cartridge Fuses 2012.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements Current Edition, Including All Revisions.
- D. UL 248-4 - Low-Voltage Fuses - Part 4: Class CC Fuses Current Edition, Including All Revisions.
- E. UL 248-8 - Low-Voltage Fuses - Part 8: Class J Fuses Current Edition, Including All Revisions.
- F. UL 248-10 - Low-Voltage Fuses - Part 10: Class L Fuses Current Edition, Including All Revisions.
- G. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses Current Edition, Including All Revisions.
- H. UL 248-15 - Low-Voltage Fuses - Part 15: Class T Fuses Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
 - a. Fusible Switches for Switchboards: See Section 262413.
 - b. Fusible Switches for Motor Control Centers: See Section 262419.
 - c. Fusible Switches for Busway: See Section 262501.
 - d. Fusible Enclosed Switches: See Section 262816.16.
 - 2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.
 - 1. Spare Fuse Cabinet: Include dimensions.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Fuses: One set(s) of three for each type and size installed.

3. Fuse Pullers: One set(s) compatible with each type and size installed.
4. Spare Fuse Cabinet Keys: Two.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com/#sle.
- B. Littelfuse, Inc: www.littelfuse.com/#sle.
- C. Mersen: ep-us.mersen.com/#sle.

2.2 APPLICATIONS

- A. Service Entrance:
 1. Fusible Switches up to 600 Amperes: Class RK1, time-delay.
 2. Fusible Switches Larger Than 600 Amperes: Class L, time-delay.
- B. Feeders:
 1. Fusible Switches up to 600 Amperes: Class RK1, time-delay.
 2. Fusible Switches Larger Than 600 Amperes: Class L, time-delay.
- C. General Purpose Branch Circuits: Class RK1, time-delay.
- D. Individual Motor Branch Circuits: Class RK1, time-delay.
- E. In-Line Protection for Pole-Mounted Luminaires: Class CC, time-delay.
- F. Primary Protection for Control Transformers: Class CC, time-delay.

2.3 FUSES

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
- C. Provide fuses of the same type, rating, and manufacturer within the same switch.
- D. Comply with UL 248-1.
- E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
- F. Voltage Rating: Suitable for circuit voltage.
- G. Class R Fuses: Comply with UL 248-12.
- H. Class L Fuses: Comply with UL 248-10.
- I. Class CC Fuses: Comply with UL 248-4.
- J. Provide the following accessories where indicated or where required to complete installation:
 1. Fuseholders: Compatible with indicated fuses.
 2. Fuse Reducers: For adapting indicated fuses to permit installation in switch designed for fuses with larger ampere ratings.

2.4 SPARE FUSE CABINET

- A. Description: Wall-mounted sheet metal cabinet with shelves and hinged door with cylinder lock, suitably sized to store spare fuses and fuse pullers specified.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
- B. Verify that mounting surfaces are ready to receive spare fuse cabinet.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Do not install fuses until circuits are ready to be energized.
- B. Install fuses with label oriented such that manufacturer, type, and size are easily read.
- C. Install spare fuse cabinet where indicated.
- D. Identify spare fuse cabinet in accordance with Section 260553.

END OF SECTION

**SECTION 262816.13
ENCLOSED CIRCUIT BREAKERS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Enclosed circuit breakers.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 260573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.

1.3 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service 2013e (Amended 2017).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- H. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures Current Edition, Including All Revisions.
- I. UL 869A - Reference Standard for Service Equipment Current Edition, Including All Revisions.
- J. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.
- K. UL 1053 - Ground-Fault Sensing and Relaying Equipment Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted enclosed circuit breakers where indicated.
 - 4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for circuit breakers, enclosures, and other installed components and accessories.
 - 1. Include characteristic trip curves for each type and rating of circuit breaker upon request.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 - 1. Include dimensioned plan and elevation views of enclosed circuit breakers and adjacent equipment with all required clearances indicated.
 - 2. Include wiring diagrams showing all factory and field connections.
 - 3. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
 - 4. Include documentation of listed series ratings upon request.
 - 5. Identify mounting conditions required for equipment seismic qualification.
- D. Manufacturer's equipment seismic qualification certification.
- E. Field Quality Control Test Reports.
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- G. Project Record Documents: Record actual installed locations of enclosed circuit breakers.
- H. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed circuit breaker internal components, enclosure, and finish.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperature between 23 degrees F and 104 degrees F during and after installation of enclosed circuit breakers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Siemens Industry, Inc: www.usa.siemens.com/#sle.
- D. Substitutions: See Section 016000 - Product Requirements.

- E. Source Limitations: Furnish enclosed circuit breakers and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 ENCLOSED CIRCUIT BREAKERS

- A. Description: Units consisting of molded case circuit breakers individually mounted in enclosures.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
1. Altitude: Less than 6,600 feet.
 2. Ambient Temperature: Between 23 degrees F and 104 degrees F.
- D. Short Circuit Current Rating:
1. Provide enclosed circuit breakers with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 260573.
- E. Enclosed Circuit Breakers Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- F. Conductor Terminations: Suitable for use with the conductors to be installed.
- G. Provide thermal magnetic circuit breakers for circuit breaker frame sizes less than 225 amperes.
- H. Provide electronic trip circuit breakers for circuit breaker frame sizes 225 amperes and above.
- I. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.
- J. Provide solidly bonded equipment ground bus in each enclosed circuit breaker, with a suitable lug for terminating each equipment grounding conductor.
- K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 4X, stainless steel.
 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
 3. Provide surface-mounted or flush-mounted enclosures unless otherwise indicated.
- L. Provide externally operable handle with means for locking in the OFF position.
- M. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
1. Where electronic circuit breakers equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.
 2. Where accessory ground fault sensing and relaying equipment is used, equip companion circuit breakers with ground-fault shunt trips.
 - a. Use zero sequence ground fault detection method unless otherwise indicated.
 - b. Provide test panel and field-adjustable ground fault pick-up and delay settings.

2.3 MOLDED CASE CIRCUIT BREAKERS

- A. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
- B. Interrupting Capacity:

1. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - a. 22,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - b. 25,000 rms symmetrical amperes at 480 VAC.
 2. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
- C. Conductor Terminations:
1. Provide mechanical lugs unless otherwise indicated.
 2. Lug Material: Copper, suitable for terminating copper conductors only.
- D. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
1. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
 2. Provide interchangeable trip units where indicated.
- E. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
1. Provide the following field-adjustable trip response settings:
 - a. Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
 - b. Long time delay.
 - c. Short time pickup and delay.
 - d. Instantaneous pickup.
 - e. Ground fault pickup and delay where ground fault protection is indicated.
- F. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
- G. Provide the following circuit breaker types where indicated:
1. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
 2. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
 3. Current Limiting Circuit Breakers: Without using fusible elements, designed to limit the let-through energy to a value less than the energy of a one-half cycle wave of the symmetrical prospective current when operating within its current limiting range.
- H. Provide the following features and accessories where indicated or where required to complete installation:
1. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
 2. Auxiliary Switch: SPDT switch suitable for connection to system indicated for indicating when circuit breaker has tripped or been turned off.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed circuit breakers are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed circuit breakers.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).

- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed circuit breakers plumb.
- F. Install flush-mounted enclosed circuit breakers so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- G. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed circuit breakers such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- H. Provide grounding and bonding in accordance with Section 260526.
- I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- J. Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 260573.
- K. Set field-adjustable ground fault protection pickup and time delay settings as indicated.
- L. Identify enclosed circuit breakers in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with manufacturer's instructions and NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for circuit breakers used for service entrance and for circuit breakers larger than 100 amperes. Tests listed as optional are not required.
- D. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
 - 1. Perform inspections and tests listed in NETA ATS, Section 7.14. The insulation-resistance test on control wiring listed as optional is not required.
- E. Test GFCI circuit breakers to verify proper operation.
- F. Test shunt trips to verify proper operation.
- G. Correct deficiencies and replace damaged or defective enclosed circuit breakers.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

- A. Clean dirt and debris from circuit breaker enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

**SECTION 262816.16
ENCLOSED SWITCHES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Enclosed safety switches.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 260573 - Power System Studies: Additional criteria for the selection of equipment and associated protective devices specified in this section.
- E. Section 262813 - Fuses.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum) 2013.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches Current Edition, Including All Revisions.
- I. UL 869A - Reference Standard for Service Equipment Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed

features and accessories.

1. Include dimensioned plan and elevation views of enclosed switches and adjacent equipment with all required clearances indicated.
 2. Include wiring diagrams showing all factory and field connections.
 3. Identify mounting conditions required for equipment seismic qualification.
- D. Manufacturer's equipment seismic qualification certification.
- E. Field Quality Control Test Reports.
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- G. Project Record Documents: Record actual locations of enclosed switches.
- H. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
 2. See Section 262813 for requirements for spare fuses and spare fuse cabinets.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Siemens Industry, Inc; [_____]: www.usa.siemens.com/#sle.
- D. Substitutions: See Section 016000 - Product Requirements.
- E. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 260573.
 - 2. Minimum Ratings:
 - a. Switches Protected by Class H Fuses: 22,000 rms symmetrical amperes.
 - b. Heavy Duty Single Throw Switches Protected by Class R, Class J, Class L, or Class T Fuses: 200,000 rms symmetrical amperes.
 - c. Double Throw Switches Protected by Class R, Class J, or Class T Fuses: 100,000 rms symmetrical amperes.
- G. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- H. Provide with switch blade contact position that is visible when the cover is open.
- I. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
 - 1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
- J. Conductor Terminations: Suitable for use with the conductors to be installed.
- K. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.
- L. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- M. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 4X, stainless steel.
 - 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
- N. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- O. Heavy Duty Switches:
 - 1. Comply with NEMA KS 1.
 - 2. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Copper, suitable for terminating copper conductors only.

3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.
 - a. Provide means for locking handle in the ON position where indicated.
- P. Provide the following features and accessories where indicated or where required to complete installation:
 1. Hubs: As required for environment type; sized to accept conduits to be installed.
 2. Integral fuse pullers.
 3. Auxiliary Switch: SPDT switch suitable for connection to system indicated, with auxiliary contact operation before switch blades open and after switch blades close.
 4. Viewing Window: Positioned over switch blades for visual confirmation of contact position with door closed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.
- H. Provide fuses complying with Section 262813 for fusible switches as indicated or as required by equipment manufacturer's recommendations.
- I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- J. Identify enclosed switches in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

**SECTION 265100
INTERIOR LIGHTING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior luminaires.
- B. Exit signs.
- C. Ballasts and drivers.
- D. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 260529 - Hangers and Supports for Electrical Systems.
- B. Section 260533.16 - Boxes for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 260923 - Lighting Control Devices.
- E. Section 262726 - Wiring Devices: Manual wall switches and wall dimmers.
- F. Section 265600 - Exterior Lighting.

1.3 REFERENCE STANDARDS

- A. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code) 2013 (Corrigendum 2019).
- B. IES LM-63 - Approved Method: IES Standard File Format for the Electronic Transfer of Photometric Data and Related Information 2019.
- C. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products 2019.
- D. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources 2021.
- E. NECA/IESNA 500 - Standard for Installing Indoor Lighting Systems 2006.
- F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems 2006.
- G. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility 2012 (Reaffirmed 2018).
- H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 844 - Luminaires for Use in Hazardous (Classified) Locations Current Edition, Including All Revisions.
- K. UL 924 - Emergency Lighting and Power Equipment Current Edition, Including All Revisions.
- L. UL 1598 - Luminaires Current Edition, Including All Revisions.
- M. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.

2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
 2. Provide photometric calculations where luminaires are proposed for substitution as part or lighting submittals.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.
 2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IES LM-63 standard format upon request.
- D. Samples:
 1. Provide one sample(s) of each luminaire proposed for substitution upon request.
 2. Provide one sample(s) of each product finish illustrating color and texture upon request.
- E. Certificates for Dimming Ballasts: Manufacturer's documentation of compatibility with dimming controls to be installed.
- F. Field quality control reports.
- G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 016000 - Product Requirements, for additional provisions.
 2. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.
 3. Extra Ballasts: Two percent of total quantity installed for each type, but not less than one of each type.
- J. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for LED luminaires, including drivers.
- C. Provide five year full warranty for batteries for emergency lighting units. Life time warranty for LEDs.
- D. Provide three year full warranty and seven year pro-rata warranty for batteries for self-powered exit signs.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.
- B. Substitutions: See Section 016000 - Product Requirements except where individual luminaire types are designated with substitutions not permitted.

2.2 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including diodes & drivers or lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. Recessed Luminaires:
 - 1. Ceiling Compatibility: Comply with NEMA LE 4.
 - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
 - 3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
- H. Hazardous (Classified) Location Luminaires: Listed and labeled as complying with UL 844 for the classification of the installed location.

- I. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.
- J. LED Tape Lighting Systems: Provide all power supplies, drivers, cables, connectors, channels, covers, mounting accessories, and interfaces as necessary to complete installation.
 - 1. LED Tape - General Requirements:
 - a. Listed.
 - b. Designed for field cutting in accordance with listing.
 - c. Wet Location Applications: IEC 60529, IP 68 (waterproof) rated.
- K. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.
- L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.3 EXIT SIGNS

- A. Description: Exit signs complying with NFPA 101 and applicable state and local codes, and listed and labeled as complying with UL 924.
 - 1. Number of Faces: Single- or double-face as indicated or as required for installed location.
 - 2. Directional Arrows: As indicated or as required for installed location.
- B. Powered Exit Signs: Internally illuminated with LEDs unless otherwise indicated.
- C. Accessories:
 - 1. Provide compatible accessory high-impact polycarbonate vandal shields where indicated.
 - 2. Provide compatible accessory wire guards where indicated.

2.4 DRIVERS

- A. Ballasts/Drivers - General Requirements:
 - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
 - 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
- B. Dimmable LED Drivers:
 - 1. Dimming Range: Continuous dimming from 100 percent to one percent relative light output unless dimming capability to lower level is indicated, without flicker.
 - 2. Control Compatibility: Fully compatible with the dimming controls to be installed.
 - a. Wall Dimmers: See Section 262726.
 - b. Daylighting Controls: See Section 260923.

2.5 ACCESSORIES

- A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.
- B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.
- C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.
- D. Fire-Rated Luminaire Enclosures:
 - 1. Provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Suspended Ceiling Mounted Luminaires:
 - 1. Do not use ceiling tiles to bear weight of luminaires.
 - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
 - 3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
 - 4. Secure pendant-mounted luminaires to building structure.
 - 5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
 - 6. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gauge, connected from opposing corners of each recessed luminaire to building structure.
 - 7. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.
- G. Recessed Luminaires:
 - 1. Install trims tight to mounting surface with no visible light leakage.
 - 2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
 - 3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.
- H. Suspended Luminaires:
 - 1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
 - 2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
 - 3. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet between supports.
 - 4. Install canopies tight to mounting surface.
- I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

- J. Install accessories furnished with each luminaire.
- K. Bond products and metal accessories to branch circuit equipment grounding conductor.
- L. Exit Signs:
 - 1. Install lock-on device on branch circuit breaker serving units.
- M. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.5 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

3.6 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals, for closeout submittals.
- B. See Section 017900 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.
- D. Just prior to Substantial Completion, LED's or drivers that have failed.

3.8 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 270000
– COMMUNICATIONS INSTALLATION OVERVIEW**PART 1 INSTALLATION OVERVIEW****1.1 SUMMARY**

- A. This project encompasses the installation of high capacity cabling backbone and associated hardware to support high-bandwidth communications. Also included in the communications scope are Unshielded Twisted Pair Cabling.

1.2 THE COMPONENTS ASSOCIATED WITH THIS PROJECT ARE:

- A. Conduit and Wiremold will be used to provide a protected pathway for all cables routed or installed in an exposed environment. The pathways for this project are included in the Division 26000 series of specifications.
- B. CAT6, 350 MHz twisted pair cabling (as specified) will be home run between each telephone and/or data drop location to the nearest data closet.

1.3 RELATED SECTIONS

- A. Drawings and general provisions of contract, including General and Supplementary conditions and Division 1 Specifications sections, apply to work in this section.
- B. Division 26 and 27 Sections apply to work in this section.

PART 2 INSTALLATION PROCESS**2.1 INSTALLATION OF CONDUIT**

- A. Unless otherwise stated on drawings, Electrical Contractor under Division 26 of this specification is to provide and install conduit in all situations where cabling exits ceiling cavities. All proposed cable routes and drop locations are approximate and should be verified by the contractor. Cable lengths indicated are approximate. It is the contractor responsibility to verify cable distances prior to cutting and routing of cables. It is the contractor responsibility to verify locations and quantities of drops.
- B. All vertical cable runs between floors will be routed in conduit unless installed in a designated wiring closet, existing ceiling cavity, or specified differently. Vertical conduit runs shall be floor to ceiling or terminate in drop ceiling cavities. In all locations, penetration into the corridor ceiling cavities will be continuous and require the replacement of fire stop materials.
- C. All core drills that are required shall be provided by the electrical contractor, unless otherwise noted. It is the responsibility of the contractor to verify locations with school officials prior to drilling and to fire stop in accordance with local and state codes.

PART 3 EXECUTION**3.1 CABLING**

- A. All cables shall be routed in accordance with state and local codes and regulations. All cables installed and terminated shall follow the guidelines set forth by the manufacturer. When routing cables through ceiling cavities all cables shall be supported by bridal rings in a bundled manor and shall not be supported or rest on drop ceiling components. Cables shall be neatly swept and bundled. The maximum allowable cable sag between supports will be 6 inches as measured vertically. All cable will be run to deck height while in ceiling cavities and fastened to roof supports or the bottom of the deck. Refer to project drawings for additional details.
- B. Drop locations
1. Drop locations and types are as specified on the associated drawings. All locations are approximate and should be verified with district personnel prior to implementation.

3.2 LABELING

- A. All cables are to be labeled at both the origination and termination locations using as specified a permanent alpha numeric cabling system. Cables shall be labeled at all junction points where a single continuous cable is not used, such as in a splice panel or Demarc.
- B. Each faceplate shall have identification, which includes the cable number, and drop number if more than one of the same type of drop is installed in the room.
- C. Testing
- D. CAT6, Coax and fiber optic cables will be tested as per manufacturers' criteria, EIA/TIA and test specifications identified in this design.

PART 4 COMPLETION**4.1 PROJECT COMPLETION**

- A. All documentation will be completed as specified. All cabling will be neat and secure.
- B. Passing of data from each drop location will be done as specified, in conjunction with Owner. Refer to testing in the general specification section.
- C. All facilities such as walls, ceilings etc., shall be restored to as found or better condition. All fire barriers breached shall be restored / sealed as to local, state and federal codes.
- D. The removal of any construction or installation debris as a result of this project.
- E. The Owner is to be consulted on any alterations of wiring closets, riser locations, and drop locations as required. Should conflicts between this design and the actual install or should any unforeseen circumstance occur during installation the contractor shall consult immediately with an authorized agent of the Owner.

END OF SECTION

**SECTION 271000
STRUCTURED CABLING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper cable and terminations.
- D. Communications equipment room fittings.
- E. Communications outlets.
- F. Communications grounding and bonding.
- G. Communications identification.

1.2 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes bonding jumpers for bonding of communications systems and electrical system grounding.
- C. Section 260533.13 - Conduit for Electrical Systems.
- D. Section 260533.16 - Boxes for Electrical Systems.
- E. Section 262726 - Wiring Devices.

1.3 REFERENCE STANDARDS

- A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition 2019.
- B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment 2005e.
- C. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set 2020.
- E. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards 2009c, with Addendum (2016).
- F. TIA-569 - Telecommunications Pathways and Spaces 2019e.
- G. TIA-606 - Administration Standard for Telecommunications Infrastructure 2021d.
- H. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises 2019d.
- I. UL 444 - Communications Cables Current Edition, Including All Revisions.
- J. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers Current Edition, Including All Revisions.
- K. UL 1863 - Communications-Circuit Accessories Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.

3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Evidence of qualifications for installer.
- C. Field Test Reports.
- D. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
 1. Record actual locations of outlet boxes and distribution frames.
 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
 3. Identify distribution frames and equipment rooms by room number on drawings.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
 1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
 2. Supervisors and installers factory certified by manufacturers of products to be installed.
 3. Employing BICSI Registered Cabling Installation Technicians (RCIT) for supervision of all work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.

1.8 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 1. Comply with TIA-568 (SET) (cabling) and TIA-569 (pathways) (commercial standards).
 2. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
 3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. System Description:
 1. Offices and Work Areas: Provide one voice outlet and one data outlet in each work area.
 2. Provide additional outlets where indicated on drawings.
- C. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external

service provider.

1. Locate main distribution frame as indicated on the drawings.
- D. Intermediate Distribution Frames (IDF): Support structures for terminating horizontal cables that extend to telecommunications outlets.
1. Locate intermediate distribution frames as indicated on the drawings.
- E. Backbone Cabling: Cabling, pathways, and terminal hardware connecting intermediate distribution frames (IDF's) with main distribution frame (MDF), wired in star topology with main distribution frame at center hub of star.
- F. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.2 PATHWAYS

- A. Conduit: As specified in Section 260533.13; provide pull cords in all conduit.
- B. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

2.3 COPPER CABLE AND TERMINATIONS

- A. Manufacturers:
1. General Cable Technologies Corporation: www.generalcable.com/#sle.
 2. Berk-Tek: www.leviton.com/berktek
 3. CommScope: www.commscope.com/#sle.
- B. Copper Horizontal Cable:
1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
 2. Cable Type - Voice and Data: TIA-568.2 Category 6 UTP (unshielded twisted pair); 23 AWG.
 3. Cable Capacity: 4-pair.
 4. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
 5. Cable Jacket Color - Voice and Data Cable: Blue.
 6. Product(s):
 - a. CommScope; SYSTIMAX Twisted Pair Cables; GigaSPEED XL Category 6 U/UTP Cable: www.commscope.com/#sle.
 - b. Berk-Tek LANmark - 1000
 - c. General Cable Technologies Corporation; GenSPEED Cables: www.generalcable.com/#sle.
- C. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- D. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
1. Performance: 500 mating cycles.
 2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.
 3. Product(s):
 - a. Panduit CJ 688TGIW mini-com module
 - b. CommScope; SYSTIMAX RJ45 Jacks; MGS400 Series Category 6 U/UTP Modular Jacks: www.commscope.com/#sle.
 - c. CommScope; Uniprise RJ45 Jacks; UNJ600 Series Category 6 U/UTP Modular Jacks: www.commscope.com/#sle.

2.4 COMMUNICATIONS EQUIPMENT ROOM FITTINGS

- A. Copper Cross-Connection Equipment:

1. Patch Panels for Copper Cabling: Sized to fit EIA/ECA-310 standard 19 inch wide equipment racks; 0.09 inch thick aluminum; cabling terminated on Type 110 insulation displacement connectors; printed circuit board interface.
 - a. Jacks: Non-keyed RJ-45, suitable for and complying with same standard as cable to be terminated; maximum 48 ports per standard width panel.
 - b. Capacity: Provide ports sufficient for cables to be terminated plus 25 percent spare.
 - c. Labels: Factory installed laminated plastic nameplates above each port, numbered consecutively; comply with TIA-606.
 - d. Provide incoming cable strain relief and routing guides on back of panel.
 2. Product(s):
 - a. Panduit #CPPA48HDWBLY
 - b. CommScope; SYSTIMAX Copper Panels; 360-IPR-1100-XX Series Patch Panels: www.commscope.com/#sle.
 - c. Leviton
- B. Cable Management:
1. Manufacturers:
 - a. Chatsworth
 - b. Panduit
 - c. CommScope: www.commscope.com/#sle.

2.5 COMMUNICATIONS OUTLETS

- A. Manufacturers:
1. Panduit
 2. CommScope: www.commscope.com/#sle.
 3. Leviton
- B. Outlet Boxes: Comply with Section 260533.16.
1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
 2. Minimum Size, Unless Otherwise Indicated:
 - a. Data or Combination Voice/Data Outlets: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
- C. Wall Plates:
1. Comply with system design standards and UL 514C.
 2. Accepts modular jacks/inserts.
 3. Capacity:
 - a. Data or Combination Voice/Data Outlets: 2 ports.
 4. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 262726.

2.6 GROUNDING AND BONDING COMPONENTS

- A. Comply with TIA-607.

2.7 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.

2.8 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Factory test cables according to TIA-568 (SET).

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. Comply with Communication Service Provider requirements.
- C. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.
- D. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

3.2 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 - 1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 - 2. 12 inches from power conduits and cables and panelboards.
 - 3. 5 inches from fluorescent and high frequency lighting fixtures.
 - 4. 6 inches from flues, hot water pipes, and steam pipes.
- B. Conduit, in Addition to Requirements of Section 260533.13:
- C. Outlet Boxes:
 - 1. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of telecommunications outlets provided under this section.
 - a. Mounting Heights: Unless otherwise indicated, as follows:
 - 1) Telephone and Data Outlets: 18 inches above finished floor.
 - 2) Telephone Outlets for Side-Reach Wall-Mounted Telephones: 54 inches above finished floor to top of telephone.
 - 3) Telephone Outlets for Forward-Reach Wall-Mounted Telephones: 48 inches above finished floor to top of telephone.
 - b. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - c. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
 - d. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.
 - e. Locate outlet boxes so that wall plate does not span different building finishes.
 - f. Locate outlet boxes so that wall plate does not cross masonry joints.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
 - 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 - 2. Do not over-cinch or crush cables.
 - 3. Do not exceed manufacturer's recommended cable pull tension.
 - 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
 - 1. At Distribution Frames: 120 inches.
 - 2. At Outlets - Copper: 12 inches.
- C. Copper Cabling:
 - 1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
 - 2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.

3. Use T568B wiring configuration.

D. Identification:

1. Use wire and cable markers to identify cables at each end.
2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.
3. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.

- B. Comply with inspection and testing requirements of specified installation standards.

C. Visual Inspection:

1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect outlet plates and patch panels for complete labels.
4. Inspect patch cords for complete labels.

D. Testing - Copper Cabling and Associated Equipment:

1. Test backbone cables after termination but before cross-connection.
2. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
3. Category 5e and Above Backbone: Perform near end cross talk (NEXT) and attenuation tests.
4. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.

- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

**SECTION 284601
FIRE ALARM SYSTEM (EXISTING SYSTEM)****PART 1 - GENERAL****1.1 SCOPE & RELATED DOCUMENTS**

- A. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations in connection with the modifications and additions to the existing Fire Alarm System(s) as shown on the drawings and as herein specified.
- B. The requirements of the conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.
- C. The complete installation is to conform to the applicable sections of NFPA-72, NFPA-71, Local Code Requirements and National Electrical Code with particular attention to Article 760.
- D. Additionally, the entire installed system and all integrated system operations shall be within the guidelines of the SBCCI Standard Building Code.
- E. The work covered by this section of the specifications is to be coordinated with the related work as specified elsewhere under the project specifications.
- F. The contractor shall provide all required modifications and additions to the existing Fire Alarm System for the removal, relocation of existing devices and addition of new devices. This shall include all additional wiring, devices, modifications to the existing control panel, additional components and modules, addressable cards, testing, troubleshooting and instructions to the owner.

1.2 QUALITY ASSURANCE

- A. Each and all items of the Fire Alarm System shall be listed compatible with the existing system under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable
- B. All items shall match and be of the same manufacturer as the existing system.
- C. The equipment and installation supervision furnished under this specification is to be provided by a manufacturer who has been engaged in production of this type (software driven) of equipment for at least ten (10) years, and has a fully-equipped service organization within thirty-five (35) miles of the installation.
- D. All control equipment must have transient protection devices to comply with UL864 requirements.
- E. In addition to the UL-UOJZ requirement mentioned above, the system controls shall be UL listed for Power Limited Applications per NEC 760. All circuits must be marked in accordance with NEC article 760-23.
- F. Supplier shall provide documentation that fire alarm technicians are NICET LEVEL 2 certified (minimum of four).
- G. Suppliers' service organization must have been established in the local area for a minimum of ten (10) years with ten (10) years experience on specific equipment brand supplied.

1.3 SUBMITTALS

- A. Submit shop drawings for each piece of equipment specified including complete wiring and connection diagrams.
- B. All submittals shall be submitted in a single complete brochure, which shall be in the form of a soft cover binder with each group separated by an identified index tab.
- C. Submittals that fail to comply with the above requirements will automatically be rejected.

- D. It is the Contractor's responsibility to provide submittals in an organized and timely manner in order so as not to delay the project schedule and hamper the work of other trades.
- E. Submit certificate of Fire Alarm System operating tests.

PART 2 PRODUCTS

2.1 PERIPHERAL DEVICES

- A. The Contractor shall furnish and install addressable devices that are compatible with the existing Fire-Lite MS-9050UD addressable fire alarm System
- B. Devices Required but not limited to:
 - 1. Manual Pull Stations
 - 2. Smoke Detectors
 - 3. Combination Audible/Strobe Stations
 - 4. Visual Alarm (Strobe) Stations
 - 5. Auxiliary contacts on devices where indicated on drawings.
 - 6. Power Supplies
 - 7. Addressable Relay modules

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide and install all devices in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC - Article 760 A and C, Power-Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC-Article 760 A and B. Upon completion, the contractor shall so certify in writing to the owner and general contractor.
 - 1. All junction boxes shall be sprayed red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.
- B. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.
- C. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.
- D. The manufacturer's authorized representative shall provide on-site supervision of installation.

3.2 TESTING

- A. The completed fire alarm system shall be fully tested in accordance with NFPA-72H by the contractor in the presence of the owner's representative and the Local Fire Marshal. Upon completion of a successful test, the contractor shall so certify in writing to the owner and general contractor.

3.3 WARRANTY

- A. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.
- B. The equipment manufacturer shall make available to the owner a maintenance contract proposal to provide a minimum of two (2) inspections and tests per year in compliance with NFPA-72H guidelines.

END OF SECTION

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Preparing subgrades for slabs-on-grade, walks.
 2. Excavating and backfilling.
 3. Subsurface drainage backfill for walls and trenches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
1. Geotextiles.
 2. Controlled low-strength material, including design mixture.
 3. Warning tapes.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
1. Classification according to ASTM D 2487.
 2. Laboratory compaction curve according to ASTM D 1557.
- B. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.
- C. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
1. Do not proceed with work on any adjoining property until directed by Owner's Representative.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Material shall be clean, sound, consisting of either gravel, stone, slag, and sands meeting the requirements set forth in NYSDOT Section 304. Stone sizing shall be as specified on Contract Drawings conforming to NYSDOT Gradations 1, 2, 3, or 4. Recycled concrete products are not acceptable for use as subbase under pavement.

- E. Crushed Stone / Granular Porous Engineered Fill - Material shall be clean, sound, washed or unwashed, crushed stone of uniform quality. It shall be a 50-50 mixture of NYSDOT size designation #1 and #2 stone as per NYSDOT Standard Specifications.
- F. Select Granular Fill: Material shall meet the requirements for select granular fill Item 203.07 as defined in the New York State Department of Transportation "Standard Specifications".
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Material shall meet the requirements of Item 605.0901, Type 1, as defined in the New York State Department of Transportation "Standard Specification".
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefin or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Grab Tensile Strength: >157 lbf; ASTM D 4632.
 - 2. Sewn Seam Strength: >142 lbf; ASTM D 4632.
 - 3. Tear Strength: >56 lbf; ASTM D 4533.
 - 4. Puncture Strength: >56 lbf; ASTM D 4833.
 - 5. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
 - 6. Permittivity: 0.5 per second, minimum; ASTM D 4491.
 - 7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefin or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Grab Tensile Strength: >247 lbf; ASTM D 4632.
 - 2. Sewn Seam Strength: >222 lbf; ASTM D 4632.
 - 3. Tear Strength: >90 lbf; ASTM D 4533.
 - 4. Puncture Strength: >90 lbf; ASTM D 4833.
 - 5. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
 - 6. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:
 - 1. Portland Cement: ASTM C 150, Type I or Type II.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Normal-Weight Aggregate: ASTM C 33, 3/8-inch nominal maximum aggregate size.
 - 4. Foaming Agent: ASTM C 869.
 - 5. Water: ASTM C 94/C 94M.
 - 6. Air-Entraining Admixture: ASTM C 260.

2.4 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations and trenches from ponding on prepared subgrades, and from flooding work areas, Project site and surrounding areas.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
- C. All water removed from the trenches or excavations by pumping, bailing, siphoning, well-points, or other means shall be disposed of in such a manner so as to avoid damage to the work, work of other Contractors, surface and ground water, persons or property. Unless otherwise permitted by the Engineer, groundwater encountered within the limits of excavation shall be depressed to an elevation not less than 12 inches below the bottom thereof before pipe laying or concreting is started, and shall be so maintained until concrete and joint material have attained adequate strength.
- D. The Contractor shall not discharge water from dewatering operations directly into any line or intermittent stream, channel, wetlands or surface water. The Contractor shall not discharge water from dewatering operations directly into the storm or sanitary sewer system without prior approval of the Engineer. If in the opinion of the Engineer, water from dewatering operations contains unacceptable amounts of sediment, the water shall be treated by filtration, sedimentation basins, or other methods to reduce the amount of sediment contained in the water to allowable levels, as acceptable to the Engineer, prior to disposal.
- E. Upon completion of the section wherein the operations have been performed, the Contractor shall remove from the catch basins, ditches, and swales, all mud, silt, debris, and other accumulations discharged to these various locations. The Contractor is responsible for leaving them in a

condition similar to that which existed prior to his operations. Proper control measures shall be employed, so as to minimize siltation and erosion in and adjacent to the area of work.

3.3 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for safely placing and removing concrete formwork, for installing services and other construction, and for inspections.
1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 SUBGRADE INSPECTION

- A. Notify Owner's Representative when excavations have reached required subgrade.
- B. If Owner's Representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below slabs and pavements with a hand operated tamper to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
1. Completely proof-roll subgrade in one direction.
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Owner's Representative, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices or changes in the Work as applicable.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Owner's Representative, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2,500 psi, may be used when approved by Owner's Representative.
1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Owner's Representative.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 90 percent for non-traffic areas and 95% for traffic areas.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 2. Walks: Plus or minus 1/2 inch.
 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.14 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course under pavements and walks as follows:
 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends, if required.
 2. Shape subbase course to required crown elevations and cross-slope grades.
 3. Place subbase course 6 inches or less in compacted thickness in a single layer.
 4. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 5. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place drainage course 6 inches or less in compacted thickness in a single layer.
 3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.16 FIELD QUALITY CONTROL

- A. Special Inspections: Owner may engage a qualified special inspector to perform the following special inspections:
 - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 - 2. Determine that fill material and maximum lift thickness comply with requirements.
 - 3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner may engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Owner's Representative.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,500 square feet or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 50 lineal feet or less of wall length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Owner's Representative; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION 312000

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 31 2323 - SOIL COMPACTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Extent of soil compaction work includes, but is not limited to the following:
 - 1. Requirements for soils and backfill materials consolidation and compaction under buildings, structures, pavement, trench backfill, or other bearing components of the project.
- B. It is the Contractor's responsibility to coordinate, schedule and manage the necessary geotechnical inspections required for the project.
- C. The Owner will pay for necessary geotechnical testing and inspection during project operations.

1.3 QUALITY ASSURANCE

- A. Testing and inspection shall be performed by a qualified independent testing laboratory, under the supervision of a registered professional engineer specializing in soils engineering.
- B. The taking of samples and the performing of field compaction density tests and laboratory maximum density tests shall be done for the Contractor by an approved independent testing laboratory.
- C. Determine optimum moisture content of various soil and granular materials in accordance with ASTM D1557, Modified Proctor Tests.
- D. Provide on-site at least one person who shall supervise the soil compaction operations, and who shall be thoroughly familiar with the various types of compaction equipment, proper compacting techniques and methods, and soils behavior, and who shall direct the compaction operations.
- E. It is the responsibility of the Contractor to select, furnish and properly maintain equipment that will compact the fill uniformly to the required density.
- F. Compacted soils not meeting compaction densities shall be re-excavated, re-compacted, and re-tested until all requirements are met. All costs of testing shall be borne by the Contractor.

1.4 SUBMITTALS

- A. The results of the laboratory maximum density tests, certified by the testing laboratory for the various soil and granular materials utilized on the job.
- B. All laboratory and field compaction test and re-test reports.

1.5 JOB CONDITIONS

- A. Compaction shall not take place in freezing weather or when materials to be compacted are frozen, too wet or moist, or too dry.
- B. Schedule the work to allow ample time for laboratory tests and to permit the collecting of samples and the performing of field density tests during the backfilling operations.

- C. Protect pipes, structures, and all other subsurface work from displacement or injury during compaction operations.
- D. All operations under this section of the specifications will be subject to continuous inspection by the Owner's Representative and a soils testing laboratory. The Owner's Representative and the testing laboratory will determine and be the sole judge of the conformance of materials, workmanship, and compaction with the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 COMPACTION

- A. Utilize the proper compaction methods and equipment to suit the soils and conditions encountered.

2.2 LABORATORY TEST REPORTS

- A. As a minimum, the laboratory maximum density testing reports shall contain the following:
 - 1. Laboratory's name.
 - 2. Date, time, and specific location from which sample was taken and name of person who collected the sample.
 - 3. Moisture - Density Curve plotted on graph paper to as large a scale as is practical with all points used to derive the curve being clearly visible.
 - 4. Designation of the test method used.
 - 5. The optimum density and moisture content.
 - 6. A description of the sample.
 - 7. The date the test was performed and the person who performed the test.
 - 8. The project name, identification, and contractor's name.
 - 9. The signature of a responsible officer of the testing laboratory certifying to the information contained in the report.
- B. As a minimum, the field compaction density testing reports shall contain the following:
 - 1. Date, time, depth, and specific location at which the test was made and the person's name who performed the test.
 - 2. Designation of the test method used.
 - 3. Designation of the material being tested.
 - 4. Test number.
 - 5. In-place dry density and moisture content.
 - 6. Optimum density and moisture content.
 - 7. Percentage of optimum density achieved.
 - 8. The signature of a responsible officer of the testing laboratory certifying to the information contained in the report.

2.3 OTHER MATERIALS

- A. All other materials which are required to achieve adequate compaction shall be as selected by Contractor subject to approval of Owner's Representative.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that layers of material are no thicker than the maximum thicknesses specified in other Sections.

- B. Verify that moisture content is nearly optimum.
- C. Do not begin compaction operations until conditions are satisfactory.

3.2 PERFORMANCE

- A. Compaction densities shown are percentages of the maximum density obtainable at optimum moisture content as determined by ASTM D1557; Method C.
- B. Uniformly spread each layer. Moisten or dry each layer of material to achieve optimum moisture content. Unless otherwise specified or directed by Owner’s Representative, compact each layer of material to the following required densities:

Location	Percentage of Modified Proctor Test Density
Pipe, Pavement and Structure Backfill	95%
All other backfill areas.	90%

3.3 FIELD QUALITY CONTROL

- A. Perform a laboratory maximum density test for each type of soil proposed for use or encountered in the work. Determine optimum moisture content in accordance with ASTM D1557.
- B. Field density tests may be ordered by the Owner’s Representative at his discretion and at a minimum in accordance with the following average frequencies:
 - 1. General: One test for each type of fill and at each change in material or supplier.
 - 2. Foundations, Utility Trench and Footings: One test for compacted fill material at intervals of approximately 50 lineal feet along bearing walls or trenches.
 - 3. Under Structures and Slabs: One test for every 2,500 square feet of compacted fill or backfill, but not less than two tests per lift.
 - 4. Pavement and Mass Fill Areas: One test per 5,000 square feet of fill or backfill but not less than two per lift.
- C. Field density and moisture testing shall conform to the requirements of ASTM D1556 (sand core) or D2922 and ASTM D3017 (nuclear density). Soils shall be described in accordance with ASTM D2488, Visual-Manual Procedure.
- D. If materials fail to meet its specified compaction, grading, etc., the Contractor shall remove, replace and retest the material until the specified parameters are achieved.
- E. The Contractor is responsible for any re-testing costs.

3.4 COORDINATION

- A. Provide all assistance and cooperation during testing and coordinate operations to allow ample time for the required sampling and testing. It is the Contractor’s responsibility to coordinate all testing required.

END OF SECTION 31 2323

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 32 1313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Walks, pads, and other miscellaneous exterior flatwork.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Action Submittals:
1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material Certificates: For the following, from manufacturer:
1. Cementitious materials.
 2. Steel reinforcement and reinforcement accessories.
 3. Admixtures.
 4. Curing compounds.
 5. Applied finish materials.
 6. Bonding agent or epoxy adhesive.
 7. Joint fillers.
- D. Material Test Reports: For each of the following:
1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- E. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301 unless otherwise indicated.
- C. Preinstallation Conference: Conduct conference at Project site.
1. Review methods and procedures related to concrete paving, including but not limited to, the following:
 - a. Concrete mixture design.
 - b. Control joint layout.

- c. Quality control of concrete materials and concrete paving construction practices.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615, Grade 60; deformed.
- C. Plain-Steel Wire: ASTM A 82, as drawn.
- D. Joint Dowel Bars: ASTM A 615, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
- E. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
1. Portland Cement: ASTM C 150, gray portland cement Type I/II.
 - a. Use white cement at exposed aggregate walks.
- B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94.
- D. Air-Entraining Admixture: ASTM C 260.

- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

2.5 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
1. Compressive Strength (28 Days): 4000 psi.
 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 3. Slump Limit: 4 inches, plus or minus 1 inch.

- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 5-1/2 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture high-range, water-reducing admixture, or plasticizing and retarding admixture in concrete as required for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- F. Cementitious Materials: Limit percentage by weight of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
 - 2. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 20 feet unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- C. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- D. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing moisture-retaining-cover curing or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 - 1. Elevation: 3/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot-long, unlevelled straightedge not to exceed 1/2 inch.
 - 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
 - 5. Lateral Alignment and Spacing of Dowels: 1 inch.
 - 6. Vertical Alignment of Dowels: 1/4 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Concrete paving will be considered defective if it does not pass tests and inspections.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 1313

THIS PAGE INTENTIONALLY LEFT BLANK