

CONTRACT DOCUMENTS

VOLUME I

for

Capital Improvements Project – Phase 2
Pocantico Hills Central School District
Sleepy Hollow, NY

Central School SED #: 66-08-02-04-0-001-040
Pavilion SED #: 66-08-02-04-7-007-001

SED Submission: November 14, 2023

Issued for Bid: June 24, 2024

HUNT 3288-008

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ADVERTISEMENT FOR BIDS

NOTICE IS HEREBY GIVEN, that sealed bids, in DUPLICATE, are sought and requested by the **Pocantico Hills Central School District (hereinafter called "Owner")**, for the construction of the following Project:

Capital Improvements Project Phase 2

Bids are requested for multiple prime contracts for General Trades Work, HVAC Work, Electrical Work, Plumbing Work, and Food Service Work, in accordance with Drawings, Project Manual, and other Bidding and Contract Documents prepared by Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC 100 Hunt Center, Airport Corporate Park, Horseheads, NY 14845.

Sealed bids will be received by the Owner until 1:00 P.M. local time on July 25, 2024 at the District office, 599 Bedford Rd Sleepy Hollow, NY 10591, at which time and place all bids will be opened and publicly read aloud.

The Bidding Documents and Bid Forms may be examined at the following:

The Builders Exchange of the Southern Tier: www.bxstier.com
East - 15 Belden Street, Binghamton NY 13903 West - 65 E. Main St., Falconer, NY 14733

Builders Exchange of Rochester, 180 Linden Oaks, Suite 100, Rochester, NY 14625-2837

Construction Exchange of Buffalo & Western New York. 2660 Williams Street, Cheektowaga, NY 14227

Syracuse Builders Exchange, 6563 Ridings Rd., Syracuse, NY 13206

Dodge Data and Analytics, 2860 S State Hwy 161, Ste.160 #501 Grand Prairie, TX 75052
www.construction.com

Construction Market Data (CMD), a ConstructConnect Company. Subscribers only; website:
www.cmdgroup.com

Pocantico Hills Central School District

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC Airport Corporate Park,
100 Hunt Center, Horseheads, NY 14845-1019

Bid Documents are also available for electronic viewing at www.HUNT-EASplans.com;
including an up to date Plan Holders list.

Bid Documents may be obtained from the document distributor: Dataflow, Inc. via their designated web portal: www.nyplanroom.com. Office: Airport Corporate Park, 100 Hunt Center, Horseheads, NY 14845, phone (607) 562-2196 or (607) 772-2001 or BidSupport@goDataflow.com. Ordering from this web portal automatically places the prospective bidder on the plan holders' list. This designated web portal will be updated periodically with addenda, lists of registered plan holders, reports, and other information relevant to submitting a bid for the project. All official notifications, addenda, and other bidding documents will be offered through the designated web portal with notifications to registered bidders. Neither the Owner, Construction Manager, Architect/Engineer, nor Dataflow, Inc., as applicable will be responsible for bidding documents, including addenda, if any, that are obtained from sources other than the designated web portal.

Bid documents including plans and specifications are available for electronic download for a non-refundable fee of \$79.00, payable by credit card. Bid documents including printed sets of plans and specifications may be ordered in paper format for a refundable fee of \$100.00, payable by credit card. Non-refundable shipping charges may apply.

Refunds for printed sets will be made by Dataflow directly to the credit card provided by the bidder. Refunds for payment of one (1) copy of the printed sets will be made to those submitting bids on the forms furnished, if the printed set is returned in good condition to Dataflow within 30 days from the award of the contract or rejection of bids. Any non-bidder may be refunded their deposit only upon returning printed set PRIOR to bid opening.

All questions prior to bid opening must be received by the close of business on July 18, 2024. Questions shall be directed to James Heft at Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC at email heftj@hunt-eas.com. All bidders request for information shall use the form located in specification 00 12 00 - Request for Information. A digital copy of this form is available upon request.

As bid security, each Bid shall be accompanied by a certified check or Bid Bond made payable to Owner, in accordance with the amounts and terms described in the INSTRUCTIONS TO BIDDERS.

The Owner requires that all bids shall comply with the bidding requirements specified in the INSTRUCTIONS TO BIDDERS. The Owner may, at his discretion, waive informalities in bids, but is not obligated to do so, nor does this represent that he will do so. The Owner also reserves the right to reject any and all bids. Under no circumstances will the Owner waive any informality which, by such waiver, would give one Bidder a substantial advantage or benefit not enjoyed by all other Bidders. No Bidder may withdraw his Bid before forty-five (45) days after the actual date of the opening thereof, unless a mistake due to error is claimed by the Bidder in accordance with INSTRUCTIONS TO BIDDERS.

Attention of Bidders is particularly called to requirements as to conditions of employment to be observed and minimum wage rates to be paid under the Contract.

A Pre-Bid conference for all Bidders will be held on July 10 at 1:00 P.M. at the project/school location for the purpose of reviewing the bidding procedures, the scope of work, and inspecting the proposed work areas.

SECTION 00 12 00
REQUEST FOR INFORMATION

DATE: _____.

CONTRACT: _____.

DRAWING: _____.

SPECIFICATION SECTION: _____.

REQUEST: INCLUDE ATTACHMENTS AS REQUIRED TO CLARIFY QUESTION:

Requested by: _____
Name / Company Name

Contact Information: Phone _____ E-mail: _____

ANSWER:

By: _____ Date: _____ RFI #: _____



AIA® Document A701® – 2018

Instructions to Bidders

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

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

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

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

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

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845

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

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

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

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

ARTICLE 1 DEFINITIONS

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

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

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

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

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

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

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

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the 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 shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

Bidding Documents are available in paper copy or electronic format, as outlined in the Advertisement for Bids.

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

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

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

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

§ 3.2 Modification or Interpretation of Bidding Documents

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

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

Requests shall be on form provided in the Bidding Documents, and submitted electronically, as outlined in the Advertisement for Bids.

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

§ 3.3 Substitutions

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

§ 3.3.2 Substitution Process

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

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

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

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

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

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

§ 3.4 Addenda

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

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

Addenda, where practical, will be transmitted electronically regardless of how Bidding Documents were received. In all other instances, Addenda will be issued in paper copy.

§ 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.

§ 3.5 Or Equal Clause

§ 3.5.1 The use of manufacturer's brand names, catalog numbers, and similar proprietary identifying data in the contract documents are not intended to eliminate from consideration products that are equivalent in quality, appearance and function to those specified. Where, in the specifications, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal, and the contractor may select one of those items. Further, the contractor may be requested to submit information describing in specific detail, wherein the bid material differs from the quality and performance required by the base specifications, and such other information as may be required by the Architect. The risk of acceptance of bid equivalents is the responsibility of the contractor.

§ 3.5.2 If the contractor desires to use any kind, type, brand, or manufacturer of material other than those named in the Specification, he shall indicate in writing on the form included in Specification Section 00 44 00 Equivalent Listing, prior to award of contract, that kind, type, brand, or manufacture is included in the base and/or alternate bids for the specified item(s).

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 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

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

affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

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

§ 4.2 Bid Security

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

(Insert the form and amount of bid security.)

Bid security shall be in the amount of 5% of the bid amount, cash will not be accepted as bid security. Bid security shall be in one of the following forms:

a. Bid Bond from a company listed on Treasury Circular 570.

b. Certified Check.

c. Bank Check.

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

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

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning 45 days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

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

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

Bids shall be submitted in paper copy as outlined in the Advertisement for Bids, and in accordance with Article 4 of these Instructions.

§ 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 two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:

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

Notwithstanding any other provisions or regulations, the bid security shall be returned to the Bidder, at the address listed on the Bid Form as soon as is reasonable and practical.

§ 4.4.4 The stipulated time period after the receipt of bids during which bids may not be withdrawn is 45 calendar days. The stipulated time period within which alternates may not be withdrawn by the successful bidder is 120 days after acceptance of the 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 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. 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, unless such a Statement has been previously required and submitted for this Bid.

§ 6.1.1 A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

§ 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.
- .4 a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 20 00.**

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

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

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. **The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.**

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

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

§ 7.2 Time of Delivery and Form of Bonds

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

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

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

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

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

.5 Drawings

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

.6 Specifications

Section	Title	Date	Pages
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.7 Addenda:

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

.8 Other Exhibits:

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

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

The Sustainability Plan:

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

[] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)



Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:48:34 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ – 2018, Instructions to Bidders, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)

SECTION 00 31 32
GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUBSURFACE INVESTIGATION REPORT

- A. The following Geotechnical Report, prepared by Tectonic for the Pocantico Hills Central School District; Report No. 10983.01 Dated 01/25/2022. For the Pocantico Hill Central School Additions project, describes the result of the subsurface investigation made on the site. This report and the tabulated results of the borings are included for the Contractor's information only. The Contractor shall determine soil conditions and shall accept conditions as they exist.
- B. The data on indicated subsurface conditions are not intended as representation or warranties of the continuity of such conditions between soil borings. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. The data is made available for the convenience of the Contractor.
- C. The Contractor is responsible for any conclusions drawn from soil investigation data. If the Contractor prefers not to assume such risk, he is under obligation to employ his own experts to analyze available information. The Contractor is responsible for any consequences resulting from actions taken by the Contractor on conclusions obtained.

PART 2 PRODUCTS - (NOT USED)

PART 3 EXECUTION

3.1 ATTACHMENTS - GEOTECHNICAL REPORT ATTACHED

END OF SECTION

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

**GEOTECHNICAL EVALUATION
POCANTICO HILLS CENTRAL SCHOOL DISTRICT SITE IMPROVEMENTS
599 BEDFORD ROAD
SLEEPY HOLLOW, WESTCHESTER COUNTY, NEW YORK**

Submitted To:

**Pocantico Hills CSD
c/o BBS Architects, Landscape
Architects & Engineers, PC**

599 Bedford Road
Sleepy Hollow, New York 10591

January 25, 2022

W.O. 10983.01

Submitted By:

**Tectonic Engineering
Consultants, Geologists & Land
Surveyors, D.P.C.**

1279 Route 300, 2nd Floor
Newburgh, NY 12550

(P) 845.567.6656

(F) 845.567.6248

Pocantico Central School District
c/o BBS Architects, Landscape Architects & Engineers, PC
599 Bedford Road
Sleepy Hollow, New York 10591

Attention: Mr. Donald Booth
C/O: Mr. Gregory E. O'Connor, A.I.A. – BBS Architects, Landscape Architects & Engineers, PC
VIA E-MAIL (ogconnor@bbsarch.com)

January 25, 2022

RE: W.O. 10983.01
GEOTECHNICAL INVESTIGATION
POCANTICO CENTRAL SCHOOL DISTRICT IMPROVEMENTS
599 BEDFORD ROAD
SLEEPY HOLLOW, WESTCHESTER COUNTY, NEW YORK

Dear Mr. O'Connor;

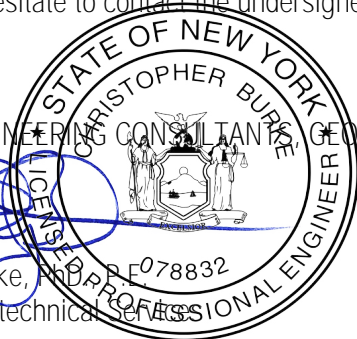
Tectonic Engineering Consultants, Geologists, and Land Surveyors D.P.C. (Tectonic) has completed a subsurface investigation and geotechnical engineering evaluation for the proposed site improvements to Pocantico Hills Central School District, located at 599 Bedford Road, Sleepy Hollow, Westchester County, New York. The purpose of the investigation was to characterize the subsurface conditions at the site and to develop geotechnical design and construction criteria for proposed improvements, which we understand may consist of the construction of a new maintenance building, asphalt paving, and athletic field improvements. This report presents our findings and recommendations.

We appreciate this opportunity to assist you with this project. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

TECTONIC ENGINEERING CONSULTANTS, GEOLOGISTS, AND LAND SURVEYORS D.P.C.

Christopher Burke, P.E. 078832
Manager of Geotechnical Services



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GEOTECHNICAL EVALUATION
 PROPOSED BUILDING AND SITE IMPROVEMENTS
 POCANTICO HILLS CENTRAL SCHOOL DISTRICT
 599 BEDFORD ROAD
 SLEEPY HOLLOW, NEW YORK

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1.0 INTRODUCTION

In accordance with your request and authorization, Tectonic Engineering Consultants, Geologists, and Land Surveyors D.P.C. (Tectonic) has completed a subsurface investigation and geotechnical engineering evaluation for the proposed additions and site improvements to the Pocantico Hills Central School District campus, in Sleepy Hollow, New York. The purpose of the investigation was to evaluate the subsurface conditions within the areas of a new proposed building, and existing areas to be improved, and to provide geotechnical recommendations for design and construction of the proposed structures and improvements. This report presents detailed information about the investigations, our findings and recommendations.

2.0 SCOPE OF SERVICES

The geotechnical investigation was performed for the Pocantico Hills Central School District (hereafter referred to as the Client), and coordinated through BBS Architects, Landscape Architects & Engineers, PC, herein referred to as Client Agent. The scope of the geotechnical investigation consisted of the following:

- Review of geological information publicly available through the United States Geological Survey (USGS) and the National Resources Conservation Service (NRCS).
- Drilling, sampling, and logging of fifty-three (53) test borings within the areas of the proposed building and improvements. These included:
 - Seven (7) borings (designated borings B-1 through B-5, B-1A, and B-4A) for the proposed new building in the northeast corner of the site.
 - Five (5) borings (designated borings B-37 through B-39, B-37A, B-37B) for new stairs and ramps to be installed in the northeast corner of the existing school building.
 - Thirteen (13) borings (designated borings B-19 through B-30, and B-29A) for improvements to the existing athletic fields located in the southwest corner of the site.
 - Sixteen (16) borings (designated borings B-6 through B-18, B-9A through B-11A) for new pavement sections on existing roads, circles, and parking areas to the southwest and southeast of the existing school building.
 - Ten (10) borings (designated borings B-31 through B-36, B-32A through B-34A, and B-36A) for new pavement sections on existing roads and parking areas in the northwest corner of the site.
 - Two (2) borings (designated borings B-40 and B-41) for new pavement sections to be located in the northeast corner of the existing school building.

- Drilling and performance of twelve (12) infiltration tests within the existing athletic fields, designated as I-19 through I-30.
- Field inspection of the borings by an engineering geologist, working under the supervision of a New York State licensed Professional Engineer.
- Performance of laboratory testing of soil samples selected to assist in the field classifications and help evaluate the engineering characteristics of the soils underlying the site.
- Geotechnical engineering analyses of the subsurface conditions as they relate to the design and construction of the proposed structures, pavement sections, and site improvements.
- Preparation of this report presenting the results of the subsurface investigation, engineering analyses, and our geotechnical recommendations for the design and construction of foundations for the proposed additions.

3.0 SITE AND PROJECT DESCRIPTIONS

The project site is on the campus of the Pocantico Hills Central School, located at 599 Bedford Road, in the Village of Sleepy Hollow, Town of Mount Pleasant, Westchester County, New York. The campus contains the existing school building in the center of the site, existing athletic fields to the southwest, parking areas to the northwest and east, and drive aisles with bus loops adjacent to the southwest and southeast corners of the school building.

Overall, the site grades generally slope downwards from north to south, with surface elevations ranging from between approximately +452 feet in the northwest corner of the site, to approximately +385 feet in the south towards the athletic fields. In the vicinity of the existing school building, site grades slope downwards from west to east, with surface elevations ranging from approximately +431 to +399 feet. In the footprint of the proposed new building, site grades slope downwards from north to south, with surface elevations ranging from +421 to +415 feet. Within the existing athletic fields, surface elevations slope downwards from north to south, with surface elevations ranging from +395 to +385 feet. The existing asphalt drive aisles, bus loops, and parking lots range from approximately +422 feet in the northern side of the existing school building, to +399 feet on the eastern side of the existing school building. In the footprint of the proposed stairs and ramps, surface elevations slope downwards from west to east, with surface elevations ranging from between +412 to +400 feet. All surface elevations referenced herein are per the North American Vertical Datum of 1988 (NAVD88).

Based on conversations with the project team, the proposed new building to be constructed to the northeast of the existing school building will be a 40-foot by 40-foot, prefabricated building, that will be used to house maintenance vehicles, as well as general storage. The building will reportedly be between 18 to 24 feet in height and will have no below-grade basement. The building will not have any vehicle lifts. Based on preliminary plans, no significant re-grading is proposed to construct the new building. For the purposes of this report, the finished floor elevation for the proposed building is assumed to be +420.0 feet.

Additional site improvements will include the construction of new stairs, railings, and ramps adjacent to the northeast and northwest corners of the existing school building. The proposed new stairs and railings will be constructed from the building egress on the northeast corner of the school building to provide access to the parking lot. The athletic field is proposed to have new underdrainage installed. Future improvements may include the installation of bleachers, and construction of a larger soccer field in the footprint of the existing fields. The existing asphalt pavement will be removed from the drive aisles, bus loops, and parking lots, and replaced with new asphalt pavement and drainage.

4.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of the drilling, sampling, and logging of fifty-three (53) test borings, designated as borings B-1 through B-41; twelve (12) offset borings were performed due to obstructions encountered during drilling, designated as B-1A, B-4A, B-9A, B-10A, B-11A, B-29A, B-32A through B-34A, B-36A, B-37A, and B-37B; and the drilling and performance of twelve (12) infiltration tests, designated as I-19 through I-30. The test locations were generally performed at the Client Agent requested locations. The boring and infiltration test locations are shown on the attached Boring, Infiltration Test, and Bulk Sample Location Plan, Figure 1.

The borings were drilled by Core Down Drilling, LLC. between June 28 and July 8, 2021, using a track-mounted Geoprobe 7822DT, equipped with an automatic hammer. The borings were advanced using 3¹/₄-inch inside-diameter hollow-stem augers. Standard Penetration Testing (SPT) was conducted with a split-spoon sampler continuously to depths of up to 12 feet, and then 5-foot maximum intervals thereafter. SPT sampling was performed in accordance with the requirements of ASTM Standard D1586 *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*". SPT N-values were recorded for each soil sample taken. Samples of the soil obtained during the investigation were retained in glass jars, and are currently stored at our material

testing laboratory. The boreholes were backfilled with drill cuttings to match the existing conditions. Boreholes within existing roadways were cold patched with asphalt, as required.

The infiltration tests (identified as I-19 through I-30) were performed within four-inch diameter holes drilled within the existing athletic field to the southwest. The locations of the infiltration tests are also shown on Figure 1. The infiltration test holes were drilled to depths ranging from 53 to 62 inches. Each infiltration test was performed in accordance with the requirements dictated by New York State, including a pre-soak and measurement over four (4) one-hour intervals. Upon completion, the infiltration test holes were backfilled with drill cuttings.

An engineering geologist observed the subsurface investigation and prepared logs of the subsurface conditions, under the purview of a Professional Engineer licensed in New York State. All materials encountered were classified in accordance with the Unified Soil Classification System (ASTM D2488), and the Modified Burmister Soil Classification System. Copies of the boring and infiltration test logs are included in Appendix I.

5.0 LABORATORY TESTING

Laboratory testing was performed on soil samples selected to assist in evaluating the engineering properties of the encountered soils and to help in field identifications of the soils. Testing included the performance of nine (9) grain-size distribution tests, performed in general accordance with ASTM Standard D6913; three (3) Atterberg limits determinations, performed in general accordance with D4318; nine (9) organic content determinations, performed in general accordance with ASTM D2974; three (3) pH determinations, performed in general accordance with ASTM D4972; and one (1) modified Proctor test, performed in general accordance with ASTM D1557. The results of the laboratory testing are included in Appendix II.

6.0 OVERALL SUBSURFACE CONDITIONS

The encountered subsurface conditions are described in the following sections for defined areas of the project site; the proposed building to be constructed to the northeast (borings B-1 through B-5, B-1A, B-4A); new pavement sections/drainage to the southeast and southwest of the existing school building (borings B-6 through B-18, B-9A through B-11A); existing athletic fields (borings B-19 through B-30, B-29A); new pavement sections/drainage to the northwest of the existing school building (borings B-31 through B-36, B-32A through B-34A); new stairs and ramp to the northeast of the existing school building (borings B-37 through B-39, B-

37A, B-37B); and new pavement sections/drainage to the northeast of the existing school building (borings B-40 and B-41).

Within borings B-1, B-4, B-9 through B-11, B-29, B-32 through B-34, B-37, and B-37A, shallow obstructions were encountered; the borings were offset between 2 and 5 feet from the corresponding boring, and advanced.

The following sections provide generalized descriptions of the soils and groundwater conditions encountered at the site, and the infiltration test results. Detailed descriptions of the subsurface conditions are provided in the boring and infiltration test logs included in Appendix I.

As noted above, an automatic hammer was used in the SPT sampling of the borings. Given that an automatic hammer imparts more energy into the split spoon sampler than a safety hammer (N_{60}) – the standard hammer used for most geotechnical engineering calculations – an energy correction factor of 1.3 is applied to the field N-values to obtain the N_{60} -values.

6.1 Proposed New Building

A review of USGS and New York State geologic maps indicates that the site is underlain by gravelly, fine sand loam. In general, the subsurface conditions within the footprint of the new proposed building consists of, in turn, a thin veneer of topsoil-like material, uncontrolled fill, and native glacial till soils. Borings B-1 through B-5, B-1A, and B-4A were advanced within the proposed footprint of the new building. Borings B-1A and B-4A were offset between 3 and 5 feet from their corresponding borings due to encountered obstructions. The following subsection provides generalized descriptions of the soil and groundwater conditions. More detailed descriptions are provided in the attached boring logs. Underlying approximately 2-inches of topsoil-like material, fill soils were encountered between approximately 2 to 6 feet below ground surface (bgs) in borings B-1 through B-3, and B-5. The fill soils typically consist of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, fines, and construction debris. Fragments of concrete and wood were observed within the fill. Based on the composition of the fill observed, it is likely re-worked native fill. Due to the presence of construction debris, the fill soils are considered to be uncontrolled fill.

Field SPT N-values within the uncontrolled fill range between 3 and 109 blows per foot (bpf). When corrected, the SPT N_{60} -values range from approximately 4 to 142 bpf. The relatively high SPT N-values observed within the uncontrolled fill were on samples where concrete fragments were observed, indicating that the advancement of the split-spoon was likely impeded. Disregarding this sample, SPT N_{60} -values range from approximately 4 to 47 bpf, indicating a loose to dense condition. In general, the uncontrolled fill within the proposed building footprint were observed in a loose to medium dense condition. The loose fill layers extend to a depth of 4 feet bgs in boring B-5, which was advanced in the southwest corner of the proposed building footprint. The uncontrolled fill has USCS designations of SM, and GM.

Underlying the uncontrolled fill, layers of native sand, gravel, and silt soils were generally encountered to the termination depth of the borings, which extended to up to 22 feet bgs. The native soils generally consisted of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, and fines. Field SPT N-values within the native sand and gravel soils range from 2 to 64 bpf. When corrected, the SPT N_{60} -values range from between approximately 3 and 83 bpf, indicating a very loose to very dense condition. In general, the native sands and gravel soils were encountered in a medium dense condition. Loose layers of sand was encountered between 12 and 14 feet bgs in boring B-1A, and 8 to 10 feet in boring B-2.

In borings B-2 and B-3, a layer of native silt was observed at depths of between approximately 4 and 8 feet bgs. Field SPT N-values within the silt layers range from 3 to 11 bpf. When corrected, SPT N_{60} -values range from approximately 4 to 14 bpf, indicating a loose to medium dense condition. The native soils has USCS classifications of SM, GM, and ML.

As indicated on the boring logs, free groundwater or saturated soil conditions were encountered within borings B-2 and B-4A, at approximate depths of 20 feet bgs. It should be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

6.2 Proposed New Stairs and Ramps

Borings B-37 through B-39, B-37A, and B-37B were advanced within the northeast corner of the existing school building, in the footprint of proposed new stairs and ramps. In general, the subsurface conditions consist of, in turn, 1 to 6 inches of topsoil-like material, and native glacial till soils. The following subsection provides generalized descriptions of the soil and groundwater conditions. More detailed descriptions are provided in the attached boring logs.

Underlying a relatively thin veneer of topsoil-like material, native soils were encountered to the termination depth of the borings, which extended up to 17 feet bgs. The native soils generally consisted of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, and fines, or silty clay, with varying amounts of coarse-to-fine sand and gravel. Field SPT N-values within the native soils range from 2 to sampler refusal, indicated by over 50 blows of the sampler with less than 6 inches of sampler advancement. When corrected, the SPT N_{60} -values range from between approximately 3 and 65 bpf, indicating a very loose to very dense condition. In general, the native soils were encountered in a loose to medium dense condition.

Soft silts were generally encountered in the upper 8 feet of the soil profile. In boring B-37, soft silt and clay were encountered between 2 and 6 feet bgs; soft clay and silt was observed between 6 and 8 feet bgs in boring B-39. Loose layers of coarse-to-fine sand were encountered between 0 to 4 feet bgs in boring B-38.

Laboratory results of soil samples tested indicate the native sand soils are comprised of approximately 11 percent coarse to fine gravel, 57 percent coarse to fine sand, and 32 percent passing the #200 sieve. The native soils have USCS classifications of SM, ML, and GM.

As indicated on the boring logs, saturated soil conditions were encountered within borings B-37 and B-39, at approximate depths of between 4 and 6 feet bgs. Groundwater was not encountered to the termination depth of boring B-38, which was advanced to a depth of 15.75 feet, so the groundwater may have been encountered in a perched condition. It should be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

6.3 Existing Athletic Fields

Borings B-19 through B-30 were advanced within the existing athletic fields to the southwest of the existing school building. In general, the subsurface conditions consist of, in turn, 4 to 10 inches of topsoil-like material, and native glacial till soils. Borings B-19, B-20, B-23, B-24, B-28, and B-29 were performed within the northern baseball field. Borings B-21, B-22, B-25 through B-27, and B-30 were performed within the southern baseball field. The following subsection provides generalized descriptions of the soil and groundwater conditions. More detailed descriptions are provided in the attached boring logs.

Underlying a relatively thin veneer of topsoil-like material or asphalt, native soils were encountered to the termination depth of the borings, which extended up to 17 feet bgs. The native soils generally consisted of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, and fines, or silty clay, with varying amounts of coarse-to-fine sand and gravel. Field SPT N-values within the native soils range from weight of hammer (WOH), corresponding to the advancement of the split-spoon under the weight of the automatic hammer, to over 63 bpf. When corrected, the SPT N_{60} -values range from between approximately 0 and 82 bpf, indicating a very loose to very dense condition. In general, the native soils were encountered in a loose to medium dense condition.

Loose sands or soft silts were generally encountered in the upper 6 feet of the soil profile. Pockets of loose native material were encountered within borings B-22 and B-26, at depths of between 10 and 17 feet bgs.

Laboratory results of soil samples tested indicate the native sand soils are comprised of approximately 11 percent coarse to fine gravel, 61 percent coarse to fine sand, and 28 percent passing the #200 sieve. Organic content tests were performed on the upper layers of topsoil-like material; the soils have organic contents of between approximately 4 and 7 percent, and a pH of 5.5. A bulk sample was obtained from the southwest corner of the athletic fields, and those native soils contained approximately 9 percent fine gravel, 66 percent medium-to-fine sand, and 25 percent passing the #200 sieve. The native soils have USCS classifications of SM, ML, and GM.

As indicated on the boring logs, saturated soil conditions were encountered within borings B-19 through B-30, at approximate depths of between 3 and 10 feet bgs. It should be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

Twelve (12) infiltration tests, designated as I-19 through I-30 were performed within the existing athletic fields, adjacent to the corresponding boring. In general, these tests found that the soils on the eastern and central portions of the athletic fields have a relatively low infiltration rate, with measured rates ranging from 0 to 3 inches per hour. The western portion of the fields have a relatively high infiltration rate, with measured rates measuring from 10 to 12 inches per hour. The subsurface conditions within the eastern and central portions of the field indicate upper soils with relatively high fines content, which affects how quickly water will infiltrate. The subsurface conditions within the western portion of the field indicate the upper soils generally have a lower fines content. The results of the testing, the stable infiltration rates are presented in Table 9.2.1. Infiltration test logs are attached to Appendix I.

Table 6.3.1 – Infiltration Test Results	
Test ID	Stable Infiltration Rate (inches per hour)
I-19	0.0
I-20	0.0
I-21	0.0
I-22	0.0
I-23	1.0
I-24	3.0
I-25	1.5
I-26	0.0
I-27	0.0
I-28	10.0
I-29	12.0
I-30	12.0

6.4 Proposed New Pavement to Southwest and Southeast

Borings B-6 through B-18 were advanced within existing drive aisles, parking lots, and bus loops to the southeast and southwest of the existing school building. In general, the subsurface conditions consist of, in turn, 3 to 8 inches of asphalt pavement, areas of fill, and native glacial till soils. Uncontrolled fill was encountered within borings B-7 and B-8. Borings B-8, B-13, B-15, and B-16

were performed within landscaped areas adjacent to the existing drive aisles. Within the pavement borings, between 1 to 2-inches of top course, and 2-½ to 6-inches of base course were observed. The following subsection provides generalized descriptions of the soil and groundwater conditions. More detailed descriptions are provided in the attached boring logs.

In boring B-7, underlying approximately 1-¼ inch of top course and 2-¾ inch of base course, or 7-inches of topsoil like material in boring B-8, uncontrolled fill was encountered to depths of between 2 to 8 feet bgs. The fill soils typically consist of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, fines, and construction debris. Fragments of wood, ash, glass, and brick were observed within the fill in boring B-7 between 2 and 8 feet. Due to the presence of ash and debris, the fill soils are considered to be uncontrolled fill.

Field SPT N-values within the uncontrolled fill range between 2 and 27 blows per foot (bpf). When corrected, the SPT N_{60} -values range from approximately 3 to 35 bpf. The fill was observed in a very loose to loose condition between 4 and 8 feet within boring B-7. The uncontrolled fill has USCS designations of SM, and GM.

Native soils were encountered underlying the asphalt pavement, topsoil-like materials, or fill to the termination depth of the borings, which extended up to 12 feet bgs. The native soils generally consisted of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, and fines, or brown clayey silt, with varying amounts of coarse-to-fine sand and gravel. Field SPT N-values within the native sand and gravel soils range from 6 to 75 bpf. When corrected, the SPT N_{60} -values range from between approximately 8 and 83 bpf, indicating a very loose to very dense condition. In general, the native sands and gravel soils were encountered in a medium dense condition. The native sand and gravel soils have USCS classifications of SM and GM.

Field SPT N-values within the native clayey silt soils range from 5 to sampler refusal. When corrected, SPT N_{60} -values range from between approximately 7 to over 65 bpf. The native silt soils were generally observed in a stiff condition. The native silt soils have USCS classifications of ML.

Split-spoon refusal and auger refusal was encountered within borings B-6, B-9, B-9A, B-10, B-10A, B-11, B-14, B-17, B-18 at depths of between 2 and 12 feet bgs. Fragments of weathered schist bedrock were observed within the drill cuttings, and within the split-spoon sampler. Bedrock core samples were not obtained as part of the scope of this investigation.

As indicated on the boring logs, saturated soil conditions were encountered within borings B-11, B-12, B-13, B-15, and B-17, at approximate depths of between 4 and 10 feet bgs. It should be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

6.5 Proposed New Pavement to the Northwest

Borings B-31 through B-36, B-32A through B-34A, and B-36A were advanced to the northwest of the existing school building, in the footprint of proposed new pavement and drainage. In general, the subsurface conditions consist of, in turn, 2 inches of asphalt, 4 to 9 inches of subbase gravel, native glacial till soils, and bedrock. The following subsection provides generalized descriptions of the soil and groundwater conditions. More detailed descriptions are provided in the attached boring logs.

Underlying a relatively thin veneer of asphalt, native soils were encountered to the termination depth of the borings, which extended up to 9.25 feet bgs. The native soils generally consisted of brown coarse-to-fine gravel, with varying amounts of coarse-to-fine sand, and fines, or clayey, with varying amounts of coarse-to-fine sand and gravel. Field SPT N-values within the native soils range from 6 to over 78 bpf. When corrected, the SPT N_{60} -values range from between approximately 8 and 101 bpf, indicating a loose to very dense condition. In general, the native soils were encountered in a medium dense to dense condition.

In borings B-34 and B-36A, a layer of clayey silt was encountered between 2 and 4 feet bgs. SPT N-values within the clayey silt layer ranged from 6 to 14 bpf. When corrected, SPT N_{60} -values range from between approximately 8 to 18 bpf, indicating a stiff to very stiff condition. The native soils have USCS classifications of SM, ML, and GM.

Split-spoon refusal and auger refusal was encountered within borings B-31 through B-33, B-35 through B-37, B-32A, B-33A, B-34A, B-36A at depths of between 0.6 and 13.25 feet bgs. Fragments of weathered schist bedrock were observed within the drill cuttings, and within the split-spoon sampler. Bedrock core samples were not obtained as part of the scope of this investigation.

As indicated on the boring logs, saturated soil conditions were encountered within borings B-34, at an approximate depth of 7.25 feet bgs. It should be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

6.6 Proposed New Pavement to the Northeast

Borings B-40 and B-41 were advanced to the northeast of the existing school building, in the footprint of proposed new pavement and drainage. In general, the subsurface conditions consist of, in turn, 2 inches of topsoil-like material or 6 inches of asphalt, and native glacial till soils. The following subsection provides generalized descriptions of the soil and groundwater conditions. More detailed descriptions are provided in the attached boring logs.

Underlying a relatively thin veneer of topsoil-like material or asphalt, native soils were encountered to the termination depth of the borings, which extended up to 12 feet bgs. The native soils generally consisted of brown coarse-to-fine sand, with varying amounts of coarse-to-fine gravel, and fines, or silty clay, with varying amounts of coarse-to-fine sand and gravel. Field SPT N-values within the native soils range from 9 to 39 bpf. When corrected, the SPT N_{60} -values range from between approximately 12 and 51 bpf, indicating a medium dense to very dense condition. In general, the native soils were encountered in a medium dense to dense condition.

In boring B-40, a layer of clayey silt was encountered between 2 and 8 feet bgs. SPT N-values within the clayey silt layer ranged from 9 to 11 bpf. When corrected, SPT N_{60} -values range from between approximately 12 to 14 bpf, indicating a stiff condition. The native soils have USCS classifications of SM, ML, and GM.

As indicated on the boring logs, saturated soil conditions were encountered within borings B-40 and B-41, at an approximate depth of 4 feet bgs. It should be noted that groundwater levels fluctuate seasonally and with changing weather conditions.

7.0 SEISMIC SITE COEFFICIENTS AND LIQUEFACTION POTENTIAL

Based on the results of the subsurface investigation and the criteria outlined in the current edition of the New York State Building Code (Code), the subsurface conditions underlying the site should be considered Class D, with maximum spectral response accelerations at short periods (S_{MS}) equal to 0.463g and at 1-second periods (S_{M1}) equal to 0.146g. Based on the procedures outlined in the Code, the corresponding five-percent damped design spectral response acceleration at short periods, S_{DS} , is equal to 0.309g, and at 1-second, S_{D1} , is equal to 0.098g. It should be noted that the values given above are the same, whether the structures to be built are essential or non-essential facilities.

Liquefaction of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, granular soils saturated by a shallow groundwater table are most susceptible to liquefaction. Liquefaction occurs when an earthquake and associated ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid increase in pore-water pressure, causing the soil to behave as a fluid for short periods.

An analysis was performed to evaluate the liquefaction potential at the site, in accordance with the Code, using a procedure recommended by Youd et. al. (2001). This method estimates the stresses likely to be induced by an earthquake and the stresses likely to initiate liquefaction using the SPT N-values, the effective overburden pressure, and the peak horizontal ground acceleration caused by the design seismic event. The factors of safety against liquefaction were computed by the ratio of cyclic shear strength of the soil to the cyclic shear stress induced by the seismic event. Using a design earthquake magnitude of 5.48 and the peak horizontal ground acceleration of 0.165g, specified by the Code and reported by the USGS, the liquefaction analysis indicates that the subsurface soils have a factor of safety against liquefaction greater than the generally accepted minimum of 1.1. Subsequently, the soils underlying the site are unlikely to liquefy during the design earthquake.

8.0 DISCUSSION AND CONCLUSIONS

Construction of the proposed foundations for the proposed new building in the northeast corner of the site is feasible from a geotechnical standpoint. The results of the subsurface investigations indicate that the footprint of the new building is generally underlain by uncontrolled fill, and native loose to medium dense glacial soils. Groundwater was encountered at depths of approximately 20 feet bgs in borings B-2 and B-4A, so it is not anticipated that groundwater will affect construction of the proposed structure.

Within borings B-1, B-2, and B-3, loose sands and soft silty clays were encountered near the assumed bearing depth. Within boring B-1, a very loose layer of sand was encountered between 12 and 14 feet bgs; within boring B-2, soft clays and silts were encountered between 4 and 8 feet bgs; in boring B-3, soft silty clay was encountered between 15 and 17 feet bgs. It should also be noted that loose uncontrolled fill was encountered to a depth of 4 feet bgs in boring B-5. Due to the presence of construction debris within the uncontrolled fill, all fill within the building footprint should be removed from the zone of influence of the building foundations.

The proposed structure will be a prefabricated building used for maintenance vehicle parking and grounds storage. It is expected that the structure will impart relatively light loads. Based on conversations with the project team, significant re-grading is not anticipated; therefore, the proposed building is assumed to have a FFE of approximately +420 feet. The proposed building may be supported by traditional, shallow foundations. The assumed bearing elevation of the foundations will be at approximately +416 feet. The bottom of the uncontrolled fill layers were between +417 and +412 feet. It should also be noted that a tree stump was encountered as deep as +409 feet.

The existing, in-place fill soils should be excavated to a depth of 4 feet and compacted prior to the placement of structural fill or concrete; based on the conditions observed during the subsurface investigation, the majority of the fill soils are expected to be removed to construct the building foundations. The soft clays encountered in boring B-2, in the southeast corner of the proposed building area, should be undercut to a depth of 10 feet, and replaced with compacted granular fill. It is recommended that any soft and unsuitable soils encountered within the zone of influence of the building foundations are undercut, and replaced with properly compacted, granular fill soils.

Two (2) sets of stairs/ramps are proposed to be constructed within the northeast and northwest corners of the existing school building. Within boring B-38, in the footprint of the proposed stairs and ramps to be installed in the northeastern portion of the school building, medium dense sand soils were encountered. The second set of

stairs/ramp is proposed to be constructed in the northwest corner of the building, near boring B-35. Within boring B-35, at the top of the proposed stairs, medium dense to dense sand and gravel soils were encountered, with potential bedrock at a depth of 3.5 feet bgs. Based on the construction drawings, the top of the staircase in the northwest corner of the site will be at +431.4 feet. Bedrock was encountered at an elevation of +429.5 feet, so the stairs may bear directly on bedrock. Within boring B-37, soft silt and clay soils were encountered to a depth of approximately 6 feet bgs. It is recommended that any soft and unsuitable soils are removed from the zone of influence from the stair/ramp footings, and replaced with properly compacted, granular fill. If soft clay is encountered below the depth of frost heave of approximately 4 feet, a 12-inch layer of crushed stone or gravel should be placed between the clay layer and the controlled fill to provide frost heave protection.

It is our understanding that the proposed improvements to the athletic field will consist of the replacement of the underdrainage on the existing field. Based on the results of the infiltration tests, the eastern and central portions of the field (I-19 through I-27) have relatively low infiltration rates, with stable infiltration rates of between 0 and 3.0 inches per hour. The infiltration tests performed on the western portion of the field (I-28 through I-30) have a high infiltration rate, with stable infiltration rates of between 10 and 12 inches per hour. Within the borings with low infiltration rates, soils with high fines content were observed in the upper layer of soils, which would slow the infiltration of water. It is recommended that the upper 2 to 4 feet of silty soils on the eastern and central areas of the athletic field are undercut and replaced with a granular drainage material. A future set of bleachers may be installed on the western edge of the field, in the area of boring B-30. Within borings B-28 through B-30, advanced on the western portion of the field, the upper 4 to 6 feet consisted of clayey silt, in a soft condition. The soft clayey silt soils in the footprint of the bleacher foundations should be undercut and replaced with compacted, granular fill.

Due to relatively high fines content of the on-site soils, they should be considered to be sensitive to disturbance during excavation and/or compaction, when exposed to water. Therefore, it is critical that care be taken during construction of foundations and pavement subgrade preparation to prevent undue wetting of the soils. Due to the density and generally high fines content of the native soils, it is expected to have relatively low permeability, and to be difficult to dewater. Given the existing site grading, and the relatively deep groundwater table, we anticipate that the primary source of wetting within excavations and pavement subgrades will be from exposure to the elements, particularly rain. Grading of pavement subgrades to shed water and to prevent ponding will also be critical to prevent disturbance of the existing soils. Both of these conditions may require subgrade remediation during the construction of new structures and pavement sections, if adequate protection cannot be maintained.

Subgrade disturbance can be minimized by using proper subgrade preparation techniques, as described in Section 10 of this report.

It is Tectonic's understanding that the existing asphalt roadways, drive aisles, bus loops, and parking lots throughout the school campus will be replaced. The proposed new asphalt paving sections should be designed as discussed in Section 14.5. The recommendations provided for light-duty asphalt are based upon a California Bearing Ratio (CBR) of 5, a design life of 20 years and 500 vehicles per day, with 20 percent heavy trucks; heavy-duty asphalt is based upon a CBR of 5, design life of 20 years, 20 vehicles per day with 100 percent heavy trucks.

The following are other general conclusions that can be made regarding the proposed construction:

- Excavation should be feasible with conventional construction equipment. Construction debris may be present within the fill within the footprint of the proposed building.
- The soils found on-site are typically not suitable for use as structural fill, because of their high fines content. The existing fill and native soils should not be used as backfill behind foundation walls, because their high fines content will impede the proper drainage of the backfill. If used for general fill, these soils are moisture sensitive, and should be at or below optimum moisture content when placed and compacted, to achieve the specific degree of compaction and to provide a stable pavement subgrade. Construction delays should be expected, if the on-site soils are used.
- It is not anticipated that groundwater will be encountered during excavation activities on the site; however, perched groundwater may be encountered.
- The results of our liquefaction analysis indicate that the soils underlying the site are unlikely to liquefy.
- Monitoring should be performed to document that the construction of the proposed additions does not adversely affect the existing structure. Monitoring should include performance of preconstruction conditions surveys of the portions of the middle school building adjacent to the proposed additions. Monitoring should also include measuring vibration levels during construction to document that they are within acceptable limits.

9.0 RECOMMENDATIONS

The following sections provide our geotechnical recommendations for design and construction of the proposed building and staircase foundations, and asphalt paving. The recommendations are based on our understanding of the proposed construction, as described in Section 3, the results of our subsurface investigation and our experience in the general vicinity of the project site.

9.1 Building and Stair Foundations

The proposed building can be supported on traditional shallow spread footings and continuous wall footings that bear on native medium dense soils or controlled fill encountered at a depth of 4 feet. The existing uncontrolled fill, and soft clay encountered on the eastern portion of the site is unsuitable for bearing; however, most of the fill and soft clay is anticipated to be removed as a result of the excavation; however, deeper pockets of soft clays were encountered below the assumed bearing elevation, particularly in the southeast corner of the proposed building footprint. Any pockets of fill or soft clay soils encountered below the proposed bearing depth will be required to be removed and replaced with compacted, controlled fill. Spread and continuous wall footings can be designed for a maximum net allowable soil bearing pressure of 3,000 pounds per square foot (psf). Section 10 of this report provides the subgrade preparation procedures necessary to achieve the recommended bearing capacity.

Using the above design criteria, total settlement of the proposed building is estimated to be up to 1-inch and differential settlements are estimated to be less than 0.5 inch. The differential settlement is estimated between columns and over a distance of about 30 feet along continuous footings. Continuous wall footings should have a minimum width of 2.0 feet and isolated spread footing should have a minimum width of 3.0 feet. Otherwise, all footings should bear at least 4 feet below the outside grade, for frost protection.

Within the two proposed stair/ramp areas, medium dense sand and gravel soils were encountered, which are suitable for supporting the proposed stair foundations. Stair foundations bearing on medium dense native sand soils can be designed for a maximum net allowable soil bearing pressure of 3,000 psf. The top of the staircase in the northwest corner of the site may bear directly on bedrock, if encountered. If any future ramps or stairs are proposed to be installed in the footprint of boring B-37, where soft clay and silt soils were encountered between approximately 2 and 6 feet bgs, the pockets of soft clay and silt would have to be removed. Any soft clay and silt soils should be excavated and removed from the zone of influence of the staircase foundations, and replaced with compacted controlled fill. Supporting the stairs and ramps on soft clay soils may cause undesirable differential settlement.

9.2 Slab-On-Grade Floors

Slab-on-grade floors should be supported on a minimum 6-inch thick layer of free draining ½ to ¾ inch crushed stone placed over the undisturbed native soil, controlled fill, or existing fill subgrades. All moisture-sensitive floor slabs should be constructed above a vapor barrier, consisting of a polyethylene membrane with a minimum thickness of fifteen (15) mils. A coefficient of friction of 0.3 should be used between the slab and the vapor barrier. If concrete is cast directly against competent native soils, controlled fill or existing fill, a coefficient of friction of 0.35 can be used.

A subgrade modulus of 150 pounds per cubic inch (pci) is recommended for design of slab-on-grade floors bearing on 6 inches of crushed stone base placed above the existing fill. If the existing fill is removed and replaced with controlled fill, the subgrade modulus may be increased to 200 pci. The design should be in accordance with the latest edition of the American Concrete Institute (ACI 360). The subgrade modulus is suitable for estimating distributions of bearing pressure beneath the slab and for estimating bending moments and shears within the slab. It is not intended for calculating total or differential settlements.

9.3 Design for Lateral Loading of Walls

Below-grade walls should be designed in accordance with the following criteria:

Table 9.3.1 – Lateral Load Parameters		
Soil Parameter	On-Site Soil	Controlled Fill
Angle of Internal Friction	30°	34°
Active Earth Pressure Coefficient (K_a) ¹	0.33	0.28
Passive Earth Pressure Coefficient (K_p) ²	3.00	3.54
At-Rest Earth Pressure Coefficient (K_0) ³	0.50	0.44
Unit Weight of Soil (pounds per cubic foot)	115	130

- 1) Use for freestanding walls, such as retaining walls, where movement of up to 0.0015 X height of wall is both possible and tolerable. Otherwise, use at-rest coefficient.
- 2) Reduce passive pressure by half above a depth of 3.5 feet below exterior grade to account for disturbance caused by frost action.
- 3) Use for walls restrained against outward lateral movement, such as foundation walls.

Additional loading due to temporary and permanent surcharges should be added to the lateral loading exerted by the retained soil. Loads due to supported structures should be applied in appropriate combinations with the lateral loads.

Walls should be backfilled in accordance with Section 10.4 of this report. Placement and compaction of backfill should be observed and tested by a geotechnical engineer to monitor that proper compaction is being achieved.

9.4 Groundwater and Building Foundation Drainage

Groundwater is not likely to be encountered during excavations for the new building foundations, based on observations of the groundwater conditions during the investigation. Subsequently, the need for construction dewatering is not anticipated. Rainwater and surface water may become trapped in excavations. Dewatering can be performed with sump pumps and should be performed to allow work to be performed in the dry. Any dewatering should prevent loosening or migration of the subgrade soils. The dewatering system, if necessary, should be designed by a New York State licensed Professional Engineer.

Damp proofing should be installed on all below-grade walls where the outside grade is higher than the slab elevation. Furthermore, the soils encountered near the foundation bearing elevation contain fines. If the foundation walls are backfilled with clean granular soil, infiltrating surface water may become temporarily trapped against the walls. To avoid potential perched water from building-up, the designers may elect to install foundation drains around the perimeter of the building. The foundation drainage should consist of a minimum 12-inch wide drainage layer of crushed stone or clean gravel placed against the full-height of the foundation walls, with a collector pipe at the footing bottom. Alternatively, a geocomposite drainage board, such as **TenCate's G100 drainage composite, could be used in lieu of the crushed stone drainage layer.** The gradation specification for the drainage material is provided in Section 10.4 of this report. The crushed stone should be completely separated from the soil backfill by a permeable geotextile **having an apparent opening size (AOS) equal to the #70 U.S. Sieve, such as TenCate's Mirafi 140N.** All roof drains should be directed away from the building. Grading of the surface of the backfill and the surrounding topography should provide positive drainage away from the walls.

Construction documents should specify that foundation drains should be utilized and directed to an appropriate outlet. All roof drains should be directed away from the building. Grading of the surface of the backfill and the surrounding topography should provide positive drainage away from the walls.

9.5 Future Bleacher Foundations

Future bleachers are proposed to be constructed on the western end of the existing athletic field. Soft clayey silt soils were encountered to a depth of approximately 6 feet bgs in the proposed bleacher footprint. If encountered, soft clays in the zone of influence of the bleacher foundations should be removed, and replaced with compacted, granular fill. The proposed bleachers may be supported on shallow foundations that bear on controlled fill at a depth of approximately 4 feet. Loading on the bleachers are expected to be relatively light, so total settlements of foundations bearing on compacted fill are expected to be negligible. Section 10 of this report provides the subgrade preparation procedures necessary for foundation construction.

9.6 Pavements

It is our understanding that the proposed site improvements include the construction of new asphalt paving sections in the parking lots, drive aisles, and bus loops. Tectonic recommends that the existing paved surface be removed, and the site then be graded to the design subgrade elevations. Subgrades consisting of existing soil should be proofrolled under the observation of the project geotechnical engineer, and observed to be firm, stable and unyielding. Subgrade preparation and proofrolling should be performed in accordance with the recommendations provided in Section 10.2 of this report. For this report, the pavement design parameters were estimated by Tectonic, for standard duty traffic. The standard duty section was based upon a daily traffic of 500 vehicles, with 25 percent heavy trucks. An assumed twenty (20) year design life was used for each pavement section.

A design California Bearing Ratio (CBR) value of 5 was selected for the design of the asphalt pavement section. This CBR was selected based on the soils encountered on the site, and the compacted native soils that will underlie the pavement. We recommend that the pavement section consist of the following:

Table 9.6.1: Asphalt Concrete Pavements	
Pavement Section Type	Recommended Section
Standard Duty	2 inches Top Course HMA (Items 402.095102 or 402.125102) 3 inches Binder Course HMA (Item 402.195102 or 402.255902) 4 inches Type 2 Aggregate Subbase (Item 304.12)
Heavy-Duty Flexible Pavement	2 inches Top Course HMA (Items 402.095102 or 402.125102) 3 inches Binder Course HMA (Item 402.195102 or 402.255902) 6 inches Type 2 Aggregate Subbase (Item 304.12)

Note:

- 1) All Item Numbers are indicated in New York State Department of Transportation Standard Specifications.
- 2) Heavy-Duty pavement should be placed where busses, delivery trucks or tractor trailer trucks will travel.
- 3) Light-Duty pavement should only be placed in areas that will primarily be used by passenger vehicles, such as school district personal parking areas.

10.0 EARTHWORK CONSTRUCTION CRITERIA

The following sections present our recommendations regarding earthwork and construction monitoring.

10.1 General Site Preparation

Initially, the site of the proposed building should be cleared and grubbed, then stripped of all existing fill, building foundations, pavement, topsoil and debris. The clearing and grubbing should extend at least 5 feet beyond the planned structures to be constructed. All existing asphalt pavement should be stripped and removed. Debris and vegetation from the clearing operations should be removed from the site and disposed of at a legal disposal facility. All soft or unsuitable materials and subsurface obstructions should be removed from the building footprint and the zone of influence of the slab-on-grade or foundation. The zone of influence is defined by 1:1 (horizontal to vertical) planes sloping downward and outward from the bottom edges of the slab or footing.

Any existing utilities within the project limits should be re-routed around the foundations, or removed. The resulting excavations should be backfilled with controlled fill in accordance with the procedures outlined in Section 10.4. Trench excavations should be properly benched to allow for adequate compaction.

10.2 Subgrade Preparation

All foundation, slab-on-grade, and pavement subgrades should be inspected by the geotechnical engineer prior to the placement of controlled fill, concrete, or pavement subbase material. Based on the composition of the existing fill, and presence of soft clays, remedial removals of the in-place soil in the building footprint will likely be required. Existing fill and soft clay soils extend to depths up to 4 feet were encountered in borings, which should be removed from the zone of influence of the building foundations. Any cut areas of the site should be lowered to the planned subgrade depth, and the exposed native soils should be proofrolled to observe for potentially yielding soils. In the proposed fill areas, the surface should be cleared and grubbed, and the resulting subgrade prior to fill placement should also be proofrolled.

The foundation subgrades and any surfaces to receive controlled fill or concrete should be proofrolled under the observation of the geotechnical engineer. Proofrolling should be accomplished by making a minimum of four (4) passes in perpendicular directions with a 10-ton roller, in open areas, or a 1.5-ton trench roller, where access is confined. Proofrolling should not be performed on saturated soils or in areas having freestanding surface water, until they are dewatered and allowed to dry. Proofrolling soils that exceed the optimum moisture content may disturb the soils, resulting in more unfavorable conditions. Unsuitable materials or areas identified to be soft by the geotechnical engineer, based on visual inspection and observation of proofrolling operations should be removed and replaced with compacted controlled fill. Any subgrade soils found to be soft and yielding during proofrolling, or otherwise deemed unsuitable by the geotechnical engineer, should be removed and replaced with properly compacted select granular fill. If deemed necessary during excavation, reinforcing geostabilization fabric or geogrid (Tensar Biaxial Geogrid BX1100, or similar) may be used to augment the stability of the over-excavated area, as recommended during proofrolling by the geotechnical engineer.

Additionally, due to the relatively high silt content of the native soils, frost heave susceptibility should be considered with regard to longevity of the pavement. Full protection against frost heave would require placement of granular soil to the estimated depth of frost penetration. Full protection against frost is not typically designed for and is costly. To provide partial frost heave protection, we recommend

that a layer of granular structural fill at least 12 inches in thickness be placed between the native soils and the pavement subbase.

10.3 Rock Subgrade Preparation

If required, rock subgrades for the proposed stairs in the northwest corner of the site should be prepared approximately level and they should be cleaned of all soil materials. If lean concrete is used to provide a level subgrade, the geotechnical engineer should evaluate the degree and direction of the slope of the rock surface and their variation over the area of the leveling pad to determine the stability of the leveling pad relative to sliding failure along the concrete-bedrock interface. If it is determined that the leveling pad is unstable due to shear forces resulting from a sloping rock surface, the bedrock surface should be stepped or dowels should be installed to resist the sliding forces.

10.4 Fill and Backfill Materials

Imported structural fill should be well-graded granular soil that meets the general gradation requirements for New York State Department of Transportation (NYSDOT) Select Granular Fill (Item No. 733.1101), and as follows:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
2 Inch	100
¼ Inch	25 to 60
No. 40	5 to 40
No. 200	0 to 10

On site soils may also be used as fill and backfill material; however, given the relatively high fines content (measured between 25 and 32 percent), the specifications should state that the difficulty handling and compacting the on-site soils should be expected (if used). Both on-site soils and soils imported to the site should be free of trash, debris, roots, vegetation or other deleterious materials.

All controlled fill should be compacted to at least 95 percent of the maximum dry density at near optimum moisture contents as determined by ASTM Standard D1557, *“Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))”*. The lift thickness for the fill soils will vary depending on the type of compaction equipment used. Fills should generally be placed in uniform horizontal lifts not exceeding 12 inches in loose thickness in open areas.

In confined areas, the loose lift thickness should be reduced to 4 inches or less and each lift should be compacted with sufficient passes of hand operated vibratory or impact compaction equipment. Compaction within 5 feet of foundation walls should only be performed with hand-operated equipment.

A geotechnical engineer with appropriate field and laboratory support should approve materials for use as fill, and test backfill materials for compliance with the recommended compaction. Each lift of fill placed at the site should be tested for compaction.

Free draining crushed stone placed below floor slabs and as drainage materials behind foundation walls (if installed) should be Underdrain Filter Type I materials (Item No. 733.2001) as specified in the NYSDOT Standard Specifications and as follows:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
1 inch	100
1/2 inch	30 - 100
1/4 inch	0 - 30
No. 4	0 - 10
No. 8	0 - 5

10.5 Protection of Subgrades and Construction Dewatering

Approved soil subgrades should be protected from the effects of frost, construction traffic, perched groundwater, surface water and precipitation. The necessary protection should be provided as soon after approval by the geotechnical engineer as is practicable and should be maintained until coverage with compacted fill or concrete. It is recommended that temporary surface drainage measures be installed to divert runoff away from the proposed construction limits.

It is not expected that dewatering will be required at this site, but if necessary, it should be performed in a manner that will prevent loosening or migration of the subgrade soils and performed to maintain the water level at least 1-foot below the deepest excavation. Given the dense nature and high fines content of the on-site soils, it is anticipated that sump pits and pumps may be suitable for dewatering. The operation of sumps directly in the footing excavations should not be allowed. Sump pits should be placed at least 1-foot outside of foundation excavations for every foot below the foundation subgrade elevation that they are

excavated. The dewatering system should be designed by a New York State Licensed Professional Engineer, and it should be designed to ensure that dewatering does not result in any loss of soil.

As has been previously noted, the on-site soils contain a high percentage of fines (silt and clay) and they will soften and experience a reduction in load-carrying capacity when exposed to moisture and disturbed. They may also become unworkable if allowed to get wet. These soils are also frost susceptible and could become disturbed if allowed to freeze during construction. Additional excavation and material removal may be required if subgrades are allowed to be exposed for long durations without fill or concrete placement. Additionally, construction traffic could also disturb the native soils.

If maintaining subgrade stabilization during periods of wet weather is a concern, crushed stone may be placed on footing and/or floor subgrades after excavation and proofrolling. The crushed stone should be clean ½ to ¾ inch gravel, stone, or recycled concrete, and should not exceed 6 inches in thickness.

10.6 Excavations and Shoring

Temporary excavation slopes should conform to the latest OSHA standards, including slopes permitted for specified heights and soil conditions encountered. The presence of perched water, or other deleterious materials could require flatter slopes or temporary excavation support (e.g., shoring and bracing). Excavation support may also be necessary in areas where sufficient distance to provide adequate benching of slopes is not available, such as adjacent to existing structures adjacent to the proposed additions.

Excavations into the existing fill and native soil should be feasible using standard construction equipment (i.e. hydraulic excavator). Cobbles and boulders should be expected within both the existing fill and within the undisturbed glacial till. Design of dewatering and excavation support should conform to the latest OSHA and other applicable agency requirements. Design of all excavation slopes greater than a 4-foot depth and design of sheeting, shoring, and bracing should be performed by a New York State licensed Professional Engineer. Adequate dewatering or surface-water runoff control should be provided to avoid instability and caving of soils.

11.0 CONSTRUCTION MONITORING

A geotechnical engineer familiar with the existing subsurface conditions and having the appropriate laboratory and field-testing support should be engaged by the Client to observe that all earthwork is performed in accordance with the specifications, the Code, and the criteria provided in this report. As a minimum, the following work should be performed under the observation of the geotechnical engineer:

- Subgrade preparation
- Proofrolling
- Remedial removals of unsuitable soils
- Underpinning, if necessary
- Settlement and vibration monitoring of the existing building
- Placement and compaction of fill and backfill materials
- Dewatering, if necessary

All materials proposed for use as soil fill should be tested and approved prior to delivery to the site. Additionally, all fill materials should be tested as they are being placed to verify that the required compaction is achieved. We further recommend that Tectonic be retained to review the project plans and specifications prior to completion of the bid documents.

12.0 LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers and geologists practicing in this or similar situations. The interpretation of the field data is based on good judgment and experience. However, no matter how qualified the geotechnical engineer or detailed the investigation, subsurface conditions cannot always be predicted beyond the points of actual sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report. The recommendations contained in this report are intended for design purposes only. Contractors and others involved in the construction of this project are advised to make an independent assessment of the soil and groundwater conditions for the purpose of establishing quantities, schedules and construction techniques.

This report has been prepared for the exclusive use of Pocantico Hills Central School District, for the specific application to the proposed construction detailed in this report. We recommend that prior to construction; Tectonic Engineering Consultants, Geologists, and Land Surveyors D.P.C. reviews the project plans and specifications. It should be noted that upon review of those documents, some recommendations presented




herein might be revised or modified. In the event that any changes in the design or location of the proposed structures are planned, Tectonic shall not consider the conclusions and recommendations contained in this report valid unless reviewed and verified in writing. It is further recommended that Tectonic be retained to provide construction monitoring and inspection services to ensure proper implementation of the recommendations contained herein, which would otherwise limit our professional liability.

SC/MAS: G:\Newburgh\Geotechnical\10900\10983.01 Pocantico CSD Site Improv\Report\10983.01 Pocantico CSD Site Improvements geoinv.docx

FIGURE I



LEGEND

-  B-1 APPROXIMATE BORING LOCATION
-  I-19 APPROXIMATE INFILTRATION TEST LOCATION
-  BS-1 APPROXIMATE BULK SAMPLE LOCATION

NOTES

1. PLAN BASED ON A SUREY PROVIDED BY TECTONIC ENGINEERING CONSULTANTS, GEOLOGISTS & LAND SURVEYORS, D.P.C., DATED 8/3/21.
2. BORING, INFILTRATION TEST, AND BULK SAMPLE LOCATIONS WERE FIELD LOCATED BY TECTONIC AND SHOULD BE CONSIDERED APPROXIMATE.



Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

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 70 Pleasant Hill Road Phone: (845) 534-5959
 P.O. Box 37 (800) 829-6531
 Mountainville, NY 10953 www.tectonicengineering.com

Project Contact Info
 1279 Route 300 Phone: (845) 567-6656
 Newburgh, NY 12550

BORING, INFILTRATION TEST, AND BULK SAMPLE LOCATION PLAN

**POCANTICO CENTRAL SCHOOL DISTRICT
 599 BEDFORD ROAD
 SLEEPY HOLLOW, WESTCHESTER COUNTY, NEW YORK**

Date 08/04/21	Work Order 10983.01	Drawing No. FIGURE 1	Rev 0
Scale 1" = 125'			

APPENDIX I



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-01

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 421.0
POWER AUGER:	3 1/4"	0 TO 5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/28/21	
CASING:		TO	WEATHER: Clear TEMP: 75° F			DATE FINISH: 6/28/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	28	6 15 13	S-1	14		M	SM	2" Topsoil-like material Bwn c-f SAND, and c-f Gravel, little Clayey Silt (FILL)				
2		12										
3	26	14 12	S-2	16		M	SM	Bwn-gy c-f SAND, some c-f Gravel, little Clayey Silt (FILL)				
4		12										
5	109	25 69 40	S-3	16		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt				109 416.0
6		35										
7	64	19 26 38	S-4	22		M	GM	Bwn-gy c-f GRAVEL, some c-f Sand, little Silt				64
8		38										
9	62	33 32 30	S-5	20		M	SM	Bwn c-f SAND, little c-f Gravel, little Clayey Silt Relocated to B-1a due to concrete obstruction				62
10		43										411.0
11								End of Boring at 10'				
12												
13												
14												
15												406.0
16												
17												
18												
19												
20												401.0
21												
22												
23												

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-01a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 421.0
POWER AUGER:	3 1/4"	0 TO 20'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/28/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 6/28/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.		MOISTURE				STANDARD PENETRATION (BLOWS/FT.)						
LENGTH (IN.)	RQD (%)				1		2	3	4	5						
1							Offset 3' east of boring B-1 Augered to 10 ft, no sampling									
2																
3																
4																
5																
6																416.0
7																
8																
9																
10																411.0
11	42	14 29 13	S-1	8		M	SM									
12		7														
13	2	1 1 1	S-2	10		M	SM									
14		6														
15	46	14 32 28	S-3	14		M	SM								406.0	
16																
17																
18																
19																
20															401.0	
21	21	5 5 16 26	S-4	24		M	SM									
22																
23																

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-02

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 419.0
POWER AUGER:	3 1/4"	0 TO 20'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 6/29/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	6	3	S-1	14		M	SM	2" Topsoil-like material Bwn c-f SAND, some Clayey Silt, little c-f Gravel, trace asphalt, wood fragments (FILL)	419.0
2		6							
3	8	6	S-2	12		M	SM	Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	
4		2							
5	3	2	S-3	16		M	ML	Dk gy-bwn CLAYEY SILT, and c-f Gravel, trace c-f Gravel	414.0
6		1							
7	3	2	S-4	6		M	CL	Dk bwn-gy CLAY and Silt, some c-f Gravel	
8		1							
9	5	2	S-5	12		M	SM	Dk gy c-f SAND, some Clayey Silt, trace c-f Gravel, trace wood	
10		3							
11	35	11	S-6	16		M	SM	Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	409.0
12		17							
13		18							
14		21							
15									
16	42	26	S-7	16		M	SM	Bwn c-f SAND, some c-f Gravel, little Clayey Silt	404.0
17		26							
18		16							
19		15							
20									
21	34	25	S-8	16		W	SM	Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	399.0
22		20							
23		14							
24		27							
							End of Boring at 22'		

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-03

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 420.0	
POWER AUGER:	3 1/4"	0 TO 20'	MON. WELL	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH:	---	TO	---	DATE START: 6/28/21	
CASING:		TO	WEATHER: Clear	TEMP: 90° F	DATE FINISH: 6/28/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'	UNCONFINED COMPRESS. STRENGTH (TONS/FT)				
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	16	688	S-1	16		M	SM	2" Topsoil-like material Bwn c-f Gravel, little Clayey Silt, concrete debris (FILL)	415.0
2		2613							
3	25	1510	S-2	14		M	SM	Bwn-gy c-f SAND, and c-f Gravel, little Clayey Silt, concrete debris (FILL)	
4		99							
5	19	1189	S-3	14		M	SM	Same	415.0
6									
7									
8									
9									
10									410.0
11	18	1999	S-4	18		M	SM	Bwn-gy c-f SAND, some c-f Gravel, little Clayey Silt, trace wood debris	
12		8							
13									
14									
15									405.0
16	4	431	S-5	18		W	CL	Gy-blk SILTY CLAY, some c-f Sand, trace c-f Gravel, trace organics	
17		38							
18	17	98	S-6	16		M	SM	Gy-bwn c-f SAND, some Silty Clay, trace c-f Gravel	
19		11							
20									400.0
21	30	3417	S-7	16		M	SM	Bwn c-f SAND, some Clayey Silt, little c-f Gravel	
22		13							
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-04

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 419.0
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/28/21	
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 6/28/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	21	4 11 10	S-1	14		M	SM					
2		9 13										
3	21	9 12 11	S-2	18		M	SM					
4		12 11										
5	25	12 13 18	S-3	16		M	SM					414.0
6												
7												
8												
9												
10	50+	50/1	S-4	1		M	GP					409.0
11												
12												
13												
14												
15												404.0
16												
17												
18												
19												
20												399.0
21												
22												
23												

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-04a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				6/28/21	1:30 PM	20'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 419.0		
POWER AUGER:	3 1/4"	0 TO 20'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 6/28/21			
CASING:		TO	WEATHER: Clear TEMP: 90° F		DATE FINISH: 6/28/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'					
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5	
				LENGTH (IN.)	RQD (%)										
					STANDARD PENETRATION (BLOWS/FT.)										
1															
2															
3							Offset 5' east of boring B-4								
4															
5															414.0
6							Augered to 10', no sampling								
7															
8															
9															
10															409.0
11	18	8 10 8	S-1	16		M	Bwn-gy c-f SAND, some Clayey Silt, some c-f Gravel								
12		4													
13															
14															
15															404.0
16	27	8 13 14	S-2	16		M	Bwn c-f SAND, some Clayey Silt, trace c-f Gravel								
17		13													
18															
19															
20															399.0
21	28	11 17 11	S-3	18		W	Bwn-gy c-f SAND, some Clayey Silt, trace c-f Gravel								
22		9													
23							End of Boring at 22'								

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-05

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 418.0
POWER AUGER:	3 1/4"	0 TO 16'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/28/21	
CASING:		TO	WEATHER: Clear TEMP: 95° F			DATE FINISH: 6/28/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	9	4	S-1	16		M	SM	2" Topsoil Bwn c-f SAND, and Clayey Silt, trace c-f Gravel (FILL)	
2		3							
3	3	2	S-2	16		M	SM	Bwn c-f SAND, and Clayey Silt, trace c-f Gravel, asphalt debris (FILL)	
4		2							
5	11	5	S-3	8		M	ML	Bwn CLAYEY SILT, some c-f Gravel, little c-f Sand (FILL)	413.0
6		3							
7									
8								wood debris from 6' - 9' likely tree root stump	
9									
10									408.0
11	37	16	S-4	14		M	SM	Bwn c-f SAND, some Clayey Silt, trace c-f Gravel	
12		20							
13		17							
14		18							
15									403.0
16	50+	4	S-5	6		M	SM	Bwn c-f SAND, some Clayey Silt, trace c-f Gravel	
17		50/4							
18									
19									
20									398.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-06

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 423.0
POWER AUGER:	3 1/4"	0 TO 6.25'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21	
CASING:		TO	WEATHER: Clear TEMP: 85° F			DATE FINISH: 6/29/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 6.25'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	22	23	S-1	9		M SM	3" Asphalt Bwn-gy c-f SAND, little Clayey Silt		
2		12							
3	35	18	S-2	22		M SM	Bwn c-f SAND, some Clayey Silt, trace c-f Gravel		
4		12							
5	54	32	S-3	18		M SM	Bwn c-f SAND, some Clayey Silt, little c-f Gravel	418.0	
6	50+	52	S-4	4		M SM	Gy-bwn c-f SAND, little c-f Gravel, little Clayey Silt		
7		50/4					Auger refusal/ spoon refusal 6.25'		
8							End of Boring at 6.25'		
9									
10								413.0	
11									
12									
13									
14									
15								408.0	
16									
17									
18									
19									
20								403.0	
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-07

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 423.0	
POWER AUGER:	3 1/4"	0 TO 2'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21		
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 6/29/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)					MOISTURE
1	23	25 13 10	S-1	14		M	SM	4" Asphalt		
2		7						Bwn-gy c-f SAND, and c-f Gravel, little Clayey Silt (FILL)		
3	9	6 5 4	S-2	16		M		2" Same		
4		4						14" Wht-blk Ash, glass, burnt wood (FILL)		
5	4	3 2 2	S-3	10		M		Same (FILL)		418.0
6		1								
7	2	1 1	S-4	1		M	GM	Blk-gy-wht c-f GRAVEL, little c-f Sand, trace Silt (FILL)		
8		1								
9	25	2 6 19	S-5	16		M	SM	Bwn-blk-rd c-f SAND, some c-f Gravel, little Clayey Silt, brick (FILL)		
10		23								413.0
11	29	16 15 14	S-6	16		M	SM	Gy c-f SAND, and Clayey Silt, trace c-f Gravel		
12		14								
13								End of Boring at 12'		
14										
15									408.0	
16										
17										
18										
19										
20									403.0	
21										
22										
23										

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-08

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 420.0
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 6/29/21		
CASING:		TO	WEATHER: Clear TEMP: 85° F		DATE FINISH: 6/29/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED		1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	27	2 10 17	S-1	11		M	GM	7" Topsoil Bwn-gy c-f GRAVEL, some c-f Sand, little Silt (FILL)	415.0
2		14							
3	12	10 7 5	S-2	22		M	ML	Bwn CLAYEY SILT, little c-f Sand, little c-f Gravel	
4		4							
5	13	2 8 5	S-3	6		M	ML	Bwn CLAYEY SILT, little c-f Sand, trace c-f Gravel	415.0
6		4							
7	35	6 9 26	S-4	4		M	GM	Gy-bwn c-f GRAVEL, some c-f Sand, little Silt	
8		17							
9	21	16 13 8	S-5	14		M	SM	Bwn c-f SAND, some Clayey Silt, little c-f Gravel	410.0
10		11							
11	31	14 14 17	S-6	16		M	SM	Bwn-or c-f SAND, some Clayey Silt, little c-f Gravel	410.0
12		17							
13								End of Boring at 12'	
14									
15									405.0
16									
17									
18									
19									
20									400.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-09

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 415.0	
POWER AUGER:	3 1/4"	0 TO 4.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21		
CASING:		TO	WEATHER: Clear TEMP: 95° F			DATE FINISH: 6/29/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: 4.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)					
				LENGTH (IN.)	RQD (%)								1	2		3	4	5
1	20	26 13 7	S-1	7		M	SM		10	20	30	40	50	415.0				
2		9 6																
3	32	13 19	S-2	6		M	SM											
4		35																
4	58+	58/3	S-3	4		M	SM											
5														410.0				
6																		
7																		
8																		
9																		
10														405.0				
11																		
12																		
13																		
14																		
15														400.0				
16																		
17																		
18																		
19																		
20														395.0				
21																		
22																		
23																		

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-09a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 415.0	
POWER AUGER:	3 1/4"	0 TO 5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21		
CASING:		TO	WEATHER: Clear TEMP: 95° F			DATE FINISH: 6/29/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: 5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				STANDARD PENETRATION (BLOWS/FT.)					
LENGTH (IN.)	RQD (%)				1		2	3	4	5					
1							Offset 6' south of boring B-9								
2															
3							Augered to 4.5'								
4															
5	28+	28/6	S-1	3		M	Gy c-f SAND, little c-f Gravel, little Clayey Silt Spoon/auger refusal								410.0
6							End of Boring at 5'								
7															
8															
9															
10															405.0
11															
12															
13															
14															
15															400.0
16															
17															
18															
19															
20															395.0
21															
22															
23															

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-10

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 409.0
POWER AUGER:	3 1/4"	0 TO 2.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21	
CASING:		TO	WEATHER: Clear TEMP: 95° F			DATE FINISH: 6/29/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	32	31 15 17	S-1	16		M	SM	3.5" Asphalt Gy-wh-bwn c-f SAND, little c-f Gravel, little Clayey Silt	
2		24 17							
3	75	44 31	S-2	14		M	SM	Bwn-gy-wh c-f SAND, some Clayey Silt, little c-f Gravel	75
4		29							
5	33	16 16 17 16	S-3	7		M	SM	Bwn-gy c-f SAND, little Clayey Silt, little c-f Gravel Auger refusal @ 2.5', hole collapsing	404.0
6									
7								End of Boring at 6'	
8									
9									
10									399.0
11									
12									
13									
14									
15									394.0
16									
17									
18									
19									
20									389.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-10a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 409.0	
POWER AUGER:	3 1/4"	0 TO 2'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/29/21		
CASING:		TO	WEATHER: Clear TEMP: 95° F			DATE FINISH: 6/29/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)		
LENGTH (IN.)	RQD (%)														
1							Offset 2' south from boring B-10								
2							Augered to 2', refusal								
3							End of Boring at 2'								
4															
5															404.0
6															
7															
8															
9															
10															399.0
11															
12															
13															
14															
15															394.0
16															
17															
18															
19															
20															389.0
21															
22															
23															

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-11

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				6/30/21	9:40 AM	4'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 398.0			
POWER AUGER:	3 1/4"	0 TO 7'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21	
CASING:		TO	WEATHER: Clear TEMP: 85° F			DATE FINISH: 6/30/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 7'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	31	28 16 15	S-1	16		M	SM	5.5" Asphalt 12" Bwn-gy c-f SAND, little Clayey Silt, little c-f Gravel	
2		13 11							
3	24	13 13	S-2	24		M	SM	Dk gy c-f SAND, some Clayey Silt, trace c-f Gravel	
4		25 29							
5	44	23 21 23	S-3	14		W	GM	Dk gy-blk c-f GRAVEL, some c-f Sand, little Clayey Silt	393.0
6									
7								Auger refusal @ 7'	
8								End of Boring at 7'	
9									
10									388.0
11									
12									
13									
14									
15									383.0
16									
17									
18									
19									
20									378.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-11a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 398.0	
POWER AUGER:	3 1/4"	0 TO 3'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21		
CASING:		TO	WEATHER: Clear TEMP: 85° F			DATE FINISH: 6/30/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: 3'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)		
LENGTH (IN.)	RQD (%)														
1							Offset 5' east of boring B-11								
2							Auger refusal @ 3.0'								
3															
4							End of Boring at 3'								
5															393.0
6															
7															
8															
9															
10															388.0
11															
12															
13															
14															
15															383.0
16															
17															
18															
19															
20															378.0
21															
22															
23															

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-12

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				6/30/21	11:00 AM	2.5'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 398.0			
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21	
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 6/30/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	22	28 11 11	S-1	14		M	SM	5.5" Asphalt Bwn-gy c-f SAND, some c-f Gravel, little Clayey Silt	
2		33 37							
3	86	22 64	S-2	14		M	GM	Gy c-f GRAVEL, some c-f Sand, little Clayey Silt	86
4		16							
5									393.0
6	43	24 28 15	S-3	16		M	SM	Gy c-f SAND, some Clayey Silt, little c-f Gravel	
7		10							
8									
9									
10									388.0
11	21	2 8 13	S-4	14		W	SM	Same	
12		8							
13									
14									
15									383.0
16									
17									
18									
19									
20									378.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-13

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 397.0
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 6/30/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	9	14	S-1	14		M	SM	4" Topsoil-like material Bwn c-f SAND, little Clayey Silt, trace c-f Gravel	397.0
2		12							
3	26	12	S-2	12		M	SM	6" Bwn-gy-blk c-f SAND, little c-f Gravel, little Clayey Silt, organic odor	
4		11						6" Gy c-f SAND, some Clayey Silt	
5	24	14	S-3	14		M	SM	Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	392.0
6		9							
7									
8									
9									
10									387.0
11	15	6	S-4	12		W	SM	Bwn c-f SAND, little Clayey Silt, trace m-f Gravel	
12		9							
13									
14									
15									382.0
16									
17									
18									
19									
20									377.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-14

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 398.0
POWER AUGER:	3 1/4"	0 TO 5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21	
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 6/30/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ --- 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)		ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	10	
1	30	26 18 12	S-1	16		M	SM	8" Asphalt			
2		18						Gy-tn c-f SAND, some c-f Gravel, little Clayey Silt			
3	48	9 15 33	S-2	16		M	SM	Gy c-f SAND, some c-f Gravel, some Clayey Silt			
4		32									
5	50+	50/2	S-3	2		M	ML	Gy CLAYEY SILT, and c-f Sand, some c Gravel			393.0
6								Auger refusal @ 5'			
7								End of Boring at 5.5'			
8											
9											
10											388.0
11											
12											
13											
14											
15											383.0
16											
17											
18											
19											
20											378.0
21											
22											
23											

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-15

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				6/30/21	7:52 AM	4'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 393.0	
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 6/30/21			
CASING:		TO	WEATHER: Clear TEMP: 75° F		DATE FINISH: 6/30/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50			
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	6	1	S-1	10		M	6" Topsoil-like material		
2		2					4" Gy c-f GRAVEL, little c-f Sand, little Silt		
3	12	4	S-2	14		M	Gy c-f SAND, some Clayey Silt, little c-f Gravel, wood fragments, slight petroleum odor		
4		5							
5	10	6	S-3	14		W	Blk-gy c-f SAND, and Silty Clay, little c-f Gravel, slight petroleum odor		388.0
6		6							
7		7							
8		8					Augered to 10'		
9		9							
10		10							383.0
11	17	10	S-4	10		W	Gy c-f SAND, some Clayey Silt, trace c-f Gravel		
12		11							
13		12					End of Boring at 12'		
14									
15									378.0
16									
17									
18									
19									
20									373.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-16

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 399.0
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21	
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 6/30/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	5	1	S-1	16		M	ML	4" Topsoil	
2		2						14" Tn-bwn CLAYEY SILT, some c-f Sand, trace c-f Gravel	
3	13	6	S-2	14		M	ML	Bwn-wh CLAYEY SILT, and c-f Sand, little c-f Gravel	
4		6							
5	14	5	S-3	8		M	SM	Bwn c-f SAND, and Clayey Silt	394.0
6		6							
7									
8								Augered to 10'	
9									
10									389.0
11	23	8	S-4	14		M	SM	Tn-gy-or c-f SAND, sand Clayey Silt, little c-f Gravel	
12		9							
13		14							
14									
15									384.0
16									
17									
18									
19									
20									379.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-17

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				6/30/21	1:00 PM	10'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 402.0			
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 6/30/21	
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 6/30/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	13	18 6 7	S-1	10		M	SM	6" Asphalt Bwn c-f SAND, little Clayey Silt	
2		4 3							
3	5	2 3 3	S-2	2		M	GM	Bwn c-f GRAVEL, some Clayey Silt, little c-f Sand	
4		3 3							
5	13	5 8 7	S-3	16		M	SM	Bwn c-f SAND, and Clayey Silt, trace c-f Gravel, weathered Schist	397.0
6									
7									
8									
9									
10									392.0
11	49	14 18 31 31	S-4	18		W	ML	Bwn-blk CLAYEY SILT, some c-f Sand, some c-f Gravel, weathered SCHIST	
12									
13									
14									
15									387.0
16									
17									
18									
19									
20									382.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-18

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien																				
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson																				
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 400.0																				
POWER AUGER:	3 1/4"	0 TO 9.75'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks																					
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/6/21																					
CASING:		TO	WEATHER: Clear TEMP: 75° F			DATE FINISH: 7/6/21																					
DIAMOND CORE:		TO	DEPTH TO ROCK: 9.75'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)																					
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td>PLASTIC LIMIT %</td> <td colspan="3">WATER CONTENT %</td> <td>LIQUID LIMIT %</td> </tr> <tr> <td>X</td> <td colspan="3">O</td> <td>Δ</td> </tr> <tr> <td>10</td><td>20</td><td>30</td><td>40</td><td>50</td> </tr> </table>		1	2	3	4	5	PLASTIC LIMIT %	WATER CONTENT %			LIQUID LIMIT %	X	O			Δ	10	20	30	40	50
1	2	3	4	5																							
PLASTIC LIMIT %	WATER CONTENT %			LIQUID LIMIT %																							
X	O			Δ																							
10	20	30	40	50																							

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	25	19 9 16	S-1	16		M	SM	5" Asphalt Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	
2		28 14							
3	23	13 10	S-2	14		M	SM	Bwn c-f SAND, some Clayey Silt, little c-f Gravel	
4		9 17							
5	12	7 5 6	S-3	8		M	GM	Tn-bwn-blk c-f GRAVEL, little Clayey Silt, little c-f Sand	395.0
6		6							
7									
8								Augered to 9.75 ft, refusal encountered. Spoon advanced	
9									
10	50+	50/3	S-4	1		M	SM	Wh-bwn c-f SAND, and c-f Gravel, little Silty Clay, wht rock in spoon tip	390.0
11								End of Boring at 10'	
12									
13									
14									
15									385.0
16									
17									
18									
19									
20									380.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-19

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/2/21	8:30 AM	3.25'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 393.0
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/8/21		
CASING:		TO	WEATHER: Overcast TEMP: 70° F		DATE FINISH: 7/8/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	6	WOH 1	S-1	14			6" Topsoil-like material		
2		5					8" Bwn c-f SAND, little Clayey Silt		
3	8	5	S-2	14	M	SM	10" Bwn-gy c-f SAND, little Clayey Silt, trace c-f Gravel		
4		3			W	ML	4" Gy CLAYEY SILT, trace c-f Sand		
5	4	2	S-3	16	W	ML	Gy CLAYEY SILT, little c-f Sand		388.0
6		1							
7	37	8	S-4	0			No Recovery		
8		18							
9		19							
10		15							383.0
11	12	1	S-5	12	W	GM	Bwn c-f GRAVEL, little c-f Sand, little Clayey Silt		
12		3							
13		9							
14		6							
15									378.0
16	30	16	S-6	12	W	GM	Blk-bwn-gy c-f GRAVEL, and c-f Sand, little Clayey Silt		
17		14							
18		15							
19							End of Boring at 17'		
20									373.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-20

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				7/8/21	9:15 AM	5'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 392.0		
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/8/21			
CASING:		TO	WEATHER: Overcast TEMP: 75° F		DATE FINISH: 7/8/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered					
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3	4
								PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %				
								X	○	△				
								STANDARD PENETRATION (BLOWS/FT.)						
								●	○	△				
								10	20	30	40	50		
1	5	WOH 1	S-1	14		M	SM							
2		4												
3	2	5 1	S-2	14		M	SM							
4		1				W	ML							
5	30	11 15 15 18	S-3	16		W	SM					387.0		
6														
7														
8														
9														
10												382.0		
11	14	16 9 5 6	S-4	14		W	ML							
12														
13														
14														
15														
16	51	9 17 34 28	S-5	12		W	SM					377.0		
17														
18														
19														
20													372.0	
21														
22														
23														

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-21

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				7/7/21	9:00 AM	6'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 390.5		
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/7/21			
CASING:		TO	WEATHER: Clear TEMP: 80° F		DATE FINISH: 7/7/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50			
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	4	WOH 1	S-1	11		M	SM	4" Topsoil-like material	385.5
2		3						5' Bwn c-f SAND, little Clayey Silt	
3	2	WOH 1	S-2	16		W	SM	6" Bwn m-f SAND, little Silt	380.5
4		1						4" Bwn CLAYEY SILT, and m-f Sand	
5	10	2	S-3	24		W	SM	6" Bwn-gy-or CLAYEY SILT, trace m-f Sand	375.5
6		4						12" Bwn m-f SAND, little Clayey Silt, trace c-f Gravel	
7	24	6	S-4	24		W	SM	12" Gy-org CLAYEY SILT, little c-f Sand	370.5
8		8						Bwn c-f SAND, and Silt, trace c-f Gravel	
9		13							
10		8							
11	10	3	S-5	12		W	SM	Bwn c-f SAND, some c-f Gravel, little Clayey Silt	370.5
12		3							
13		7							
14		9							
15									
16	7	4	S-6	4		W	ML	Bwn-gy-or CLAYEY SILT, little c-f Sand	370.5
17		4							
18		4							
19		3							
20		2							
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-22

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/7/21	10:00AM	5.5'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 389.0			
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/7/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 7/7/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	10	4	S-1	5		M	GP	4" Topsoil-like material 1' Wht c GRAVEL stuck in spoon tip	
2		2				M	SM	4" Bwn m-f SAND, little Clayey Silt	
3	2	1	S-2	16		M	ML	12" Gy-or CLAYEY SILT, trace c-f Sand	
4		2						18" Same	
5	7	3	S-3	24		W	SM	6" Gy c-f SAND, some Silt, trace c-f Gravel	384.0
6		4						Bwn-gy c-f SAND, some Silty Clay, trace c-f Gravel	
7	12	6	S-4	24		W	SM	Gy c-f SAND, little Clayey Silt	
8		6							
9									
10		4							379.0
11	2	1	S-5	10		W	SM	Gy c-f SAND, little Clayey Silt	
12		3							
13	5	2	S-6	24		W	SM	Gy c-f SAND, little Clayey Silt, trace c-f Gravel	
14		2							
15		1							374.0
16	10	5	S-7	24		W	SM	16" Gy c-f SAND, trace Silt	
17		4				W	SM	8" Gy f SAND, little Silt	
18		6							
19		6							
20									369.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-23

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/8/21	11:45 AM	5'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 394.0			
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/8/21	
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/8/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	4	2	S-1	14		M	SM					
2		2										
3	12	7	S-2	24		M	SM					
4		2										
5	25	7	S-3	22		W	SM					389.0
6		18										
7		17										
8							Augered to 10'					
9												
10												384.0
11	13	12	S-4	20		W	SM					
12		7										
13		6										
14		14										
15	50+	50/1	S-1	1		W	GM					379.0
16							Blk-bwn c-f GRAVEL, and c-f Sand, trace Clayey Silt, blk rock in spoon					
17							End of Boring at 15.5'					
18												
19												
20												374.0
21												
22												
23												

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-24

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				7/8/21	10:00 AM	5.5'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 392.2	
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/8/21			
CASING:		TO	WEATHER: Overcast TEMP: 75° F		DATE FINISH: 7/8/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50			
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	3	1	S-1	14		M	ML	10" Topsoil-like material	
2		2						4' Bwn CLAYEY SILT, little c-f Sand	
3	6	3	S-2	6		M	SM	Bwn c-f SAND, some Clayey Silt, trace c-f Gravel	
4		2						2" Bwn c-f SAND, some Clayey Silt	
5	9	3	S-3	8		W	SM	6" GY CLAYEY SILT	387.2
6		6				W	ML	12" Gy-or CLAYEY SILT	
7	33	13	S-4	22		W	SM	10" Bwn-wh c-f SAND, some Clayey Silt, little c-f Gravel	
8		20				W	SM		
9		17							
10									382.2
11	27	12	S-5	2		W	GM	Bwn c GRAVEL, some Silt, little c-f Sand	
12		14							
13		13							
14		7							
15									377.2
16	25	7	S-6	6		W	GM	Bwn c-f GRAVEL, some c-f Sand, little Clayey Silt	
17		7							
18		7							
19		18							
20		14							
21									372.2
22									
23									
							End of Boring at 17'		

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. 10983.01

PROJECT: Pocantico Hills Central School District

LOCATION: Sleepy Hollow, NY

BORING No. B-25

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				7/7/21	12:30 PM	6'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 391.0	
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/7/21			
CASING:		TO	WEATHER: Clear TEMP: 90° F		DATE FINISH: 7/7/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered					
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3
1	4	1	S-1	16		M	SM						
2		3											
3	2	4	S-2	4		M	SM						
4		1											
5	11	1	S-3	20		M	ML						386.0
6		3											
7		5											
8		6											
9		13											
10													
11	17	8	S-4	14		W	SM						381.0
12		8											
13													
14													
15													
16	13	9	S-5	14		W	GM						376.0
17		7											
18		6											
19		7											
20													
21													
22													
23													

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-26

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/7/21	11:30 AM	5.5'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 390.5			
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/7/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 7/7/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	2	1	S-1	12		M	SM	8" Topsoil-like material	
2		1						4" Bwn c-f SAND, little Clayey Silt	
3	4	3	S-2	14		M	SM	Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	
4		2							
5	13	9	S-3	14		W	ML	Bwn-gy CLAYEY SILT, and c-f Sand, little c-f Gravel	385.5
6		5							
7									
8									
9									
10									380.5
11	14	7	S-4	10		W	SM	Bwn c-f SAND, little c-f Gravel, little Clayey Silt	
12		8							
13									
14									
15									375.5
16	2	1	S-5	20		W	SM	Gy c-f SAND, little Silt	
17		1							
18		1							
19		1							
20		3							370.5
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-27

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/6/21	2:00 PM	5'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 388.0			
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/6/21	
CASING:		TO	WEATHER: Clear TEMP: 90° F			DATE FINISH: 7/6/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	0	WOH	S-1	8		M	4" Topsoil-like material		
2		WOH				M	4" Dk bwn SILTY CLAY, trace c-f Sand		
3	5	1	S-2	24		W	GY-org CLAYEY SILT, little c-f Sand		
4		4							
5	10	3	S-3	16		W	Gy-or c-f SAND, some Silt		383.0
6		7							
7		6							
8		4					Augered to 10'		
9		6							
10									378.0
11	3	2	S-4	20		W	Gy-bwn c-f SAND		
12		1							
13	10	8	S-5	20		W	8" Gy c-f SAND, trace Silt		
14		4				W	2" Gy CLAYEY SILT		
15		5				W	10" Bwn c-f SAND, little Silt		
16	19	6	S-6	8		W	Gy-bwn-blk c-f GRAVEL, and Clayey Silt, some c-f Sand		373.0
17		13							
18		11					End of Boring at 17'		
19		8							
20		10							368.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-28

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/6/21	9:00 AM	6'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 395.0			
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/6/21	
CASING:		TO	WEATHER: Clear TEMP: 75° F			DATE FINISH: 7/6/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 16.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	9	2	S-1	8		M	SM	6" Topsoil-like material	
2		7						2" Bwn c-f GRAVEL, some c-f Sand, little Clayey Silt	
3	15	8	S-2	14		M	SM	Bwn-gy c-f SAND, some Clayey Silt, little c-f Gravel	
4		5							
5	8	4	S-3	1		M	SM	Bwn c-f SAND, little Clayey Silt	390.0
6		4							
7	26	11	S-4	16		W	SM	Bwn-gy c-f SAND, little Clayey Silt, little c-f Gravel	
8		15							
9		11							
10		15							
11	33	21	S-5	14		W	SM	Bwn c-f GRAVEL, and c-f Sand, little Clayey Silt	385.0
12		12							
13									
14									
15									
16	63+	16	S-6	14		W	ML	Bwn-blk CLAYEY SILT, little c-f Sand, trace c-f Gravel, highly weathered SCHIST @ spoon tip	380.0
17		13							63
18		50/5							
19									
20									
21									
22									
23									
End of Boring at 16.5'									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-29

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 393.5
POWER AUGER:	3 1/4"	0 TO 10.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/6/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 7/6/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 11.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	3	1	S-1	16		M	10" Topsoil-like material		
2		2					6" Bwn CLAYEY SILT, little c-f Sand, trace c-f Gravel		
3	0	WOH 1	S-2	16		M	Bwn-tn CLAYEY SILT, trace c-f Sand		
4		1							
5	3	WOH 1	S-3	12		W	Bwn-tn CLAYEY SILT and c-f Gravel, little c-f Sand		388.5
6		2							
7	26	15	S-4	16		W	8" Bwn-tn CLAYEY SILT, some c-f Gravel, little c-f Sand		
8		12					10" Bwn m-f SAND, little Silt		
9		14							
10	50+	50/2	S-5	6		W	Gy-bwn c-f GRAVEL, little c-f Sand, little Clayey Silt		383.5
11							Auger refusal @ 11.5'		
12							End of Boring at 11.5'		
13									
14									
15									378.5
16									
17									
18									
19									
20									373.5
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-29a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 393.0	
POWER AUGER:	3 1/4"	0 TO 9'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/6/21		
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 7/6/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: 9'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)		
LENGTH (IN.)	RQD (%)														
1							Boring offset 5' north of boring B-29								
2															
3															
4							Bwn-tn CLAYEY SILT, little c-f Gravel, trace c-f Sand								
5															388.0
6															
7															
8															
9							Auger refusal @ 9'								
10							End of Boring at 9'								383.0
11															
12															
13															
14															
15															378.0
16															
17															
18															
19															
20															373.0
21															
22															
23															

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-30

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/6/21	1:00 PM	6'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 392.0			
POWER AUGER:	3 1/4"	0 TO 13'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/6/21	
CASING:		TO	WEATHER: Clear TEMP: 85° F			DATE FINISH: 7/6/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 13.1'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	2	1	S-1	14		M	SM	6" Topsoil-like material 8" Bwn c-f SAND, little Clayey Silt, trace c-f Gravel	
2		3							
3	2	1	S-2	20		M	ML	Bwn-tn CLAYEY SILT, trace c-f Sand, trace c-f Gravel	
4		2							
5	36	8 15 21 22	S-3	20		M	SM	Gy-bwn c-f SAND, some Clayey Silt, some c-f Gravel	387.0
6									
7									
8									
9									
10									
11	18	10 8 10	S-4	18		W	ML	10" Bwn CLAYEY SILT, little c-f Sand, trace c-f Gravel	382.0
12		8				W	SM	8" Gy c-f SAND, little Silt	
13	50+	50/1	S-5	1		W	SM	Blk-gy c-f SAND, little c-f Gravel, little Silt, weathered SCHIST in spoon tip	
14									
15									377.0
16									
17									
18									
19									
20									372.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-31

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 434.0
POWER AUGER:	3 1/4"	0 TO 5.4'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 5.4'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2	3	4		5	
1	24	55 16 8	S-1	16		M	SM									
2		11														
3	57	6 10 47	S-2	14		M	SM									
4		50/2				M	GM									
5	50+	50/4	S-3	2		M	SM									429.0
6																
7																
8																
9																
10																424.0
11																
12																
13																
14																
15																419.0
16																
17																
18																
19																
20																414.0
21																
22																
23																

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-32

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 419.0	
POWER AUGER:	3 1/4"	0 TO 1.25'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21		
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV.		MOISTURE				STANDARD PENETRATION (BLOWS/FT.)							
LENGTH (IN.)	RQD (%)			10 20 30 40 50													
1	50+	58 20 30/3	S-1	12		M	SM	2.5" Asphalt, 9" subbase gravel Gy-bwn c-f SAND, and c-f Gravel, little Silt Obstruction encountered at 1.3'									
2																	
3								End of Boring at 1.3'									
4																	
5																	414.0
6																	
7																	
8																	
9																	
10																	409.0
11																	
12																	
13																	
14																	
15																	404.0
16																	
17																	
18																	
19																	
20																	399.0
21																	
22																	
23																	

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-32a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 418.5
POWER AUGER:	3 1/4"	0 TO 5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	26	52 17 9	S-1	8		M	GM		413.5
2	25+	8 25/6	S-2	2		M	GM		
3	16+	16/4	S-3	3		M	GM		
4									
5									
6									
7									
8									
9									
10									408.5
11									
12									
13									
14									
15									403.5
16									
17									
18									
19									
20									398.5
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-33

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.0
POWER AUGER:	3 1/4"	0 TO 3'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 3'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)					ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %			
				LENGTH (IN.)	RQD (%)										
1	34	40 18 16	S-1	14		M	GM SM								
2		24													
3	50+	50/3	S-2	2		M	SM								
4															
5														430.0	
6															
7															
8															
9															
10														425.0	
11															
12															
13															
14															
15														420.0	
16															
17															
18															
19															
20														415.0	
21															
22															
23															

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-33a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.5
POWER AUGER:	3 1/4"	0 TO 7'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Rain TEMP: 78° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 7'				
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.		MOISTURE				STANDARD PENETRATION (BLOWS/FT.)						
LENGTH (IN.)	RQD (%)	PLASTIC LIMIT %		WATER CONTENT %			LIQUID LIMIT %									
1							Augered to 3'									
2																
3																
4	18	31 14 4	S-1	12		M	GM	Bwn-wht c-f GRAVEL, some c-f Sand, little Clayey Silt								
5		3														
6	27	10 11 16 16	S-2	14		M	SM	Bwn c-f SAND, little Clayey Silt, trace c-f Gravel								
7	50+	50/0	S-3	1		M	GP	Wht c GRAVEL								
8								Auger/spoon refusal @ 7'								
9								End of Boring at 7'								
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-34

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/2/21	10:00 AM	7.25'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH		SURFACE ELEVATION: 435.0			
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/2/21		
CASING:		TO	WEATHER: Overcast TEMP: 75° F		DATE FINISH: 7/2/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: 9.25'		UNCONFINED COMPRESS. STRENGTH (TONS/FT)		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- --- --- --- 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)			ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	
1	22	23 10 12	S-1	14		M	GM SM					
2		8					4" Bwn c-f SAND, some Clayey Silt					
3	14	8 6	S-2	22		M	ML					
4		9					Bwn CLAYEY SILT, little c-f Sand, trace c-f Gravel, trace roots					
5	42	13 22 20 19	S-3	14		M	GM					430.0
6							Or-gy-bwn c-f GRAVEL, some c-f Sand, little Clayey Silt					
7												
8	41	28 26 15 11	S-4	14		W	GM					
9							Bwn-gy-blk c-f GRAVEL, little c-f Sand, little Clayey Silt					
10							End of Boring at 9.25'					425.0
11												
12												
13												
14												
15												420.0
16												
17												
18												
19												
20												415.0
21												
22												
23												

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-34a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.0	
POWER AUGER:	3 1/4"	0 TO 8'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21		
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: 8'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)				
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)					
LENGTH (IN.)	RQD (%)																	
1							Offset 3' west of boring B-34 Augered to 8' Auger refusal @ 8'											
2																		
3																		
4																		
5																		430.0
6																		
7																		
8																		
9							End of Boring at 8'											
10																		425.0
11																		
12																		
13																		
14																		
15																	420.0	
16																		
17																		
18																		
19																		
20																	415.0	
21																		
22																		
23																		

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-35

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 433.0
POWER AUGER:	3 1/4"	0 TO 3.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 3.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 ● PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ○ --- △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	29	55 16 13	S-1	14		M	GM	2.5" Asphalt, 4" subbase gravel Tn-bwn-gy c-f GRAVEL, little c-f Sand, little Silt	
2	25+	20 25/4	S-2	8		M	SM	Bwn-gy m-f SAND, and Silt, some f Gravel	
3	50+	50/6	S-3	2		M	SM	Gy c-f SAND, little Silt, little c-f Gravel, rock fragments	
4								End of Boring at 3.5'	
5									428.0
6									
7									
8									
9									
10									423.0
11									
12									
13									
14									
15									418.0
16									
17									
18									
19									
20									413.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-36

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.0
POWER AUGER:	3 1/4"	0 TO 0.6'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 0.6'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)			
			SAMPLE NUMBER	RECOV.		MOISTURE				1	2	3	4	5				
				LENGTH (IN.)	RQD (%)													
1	50+	2 50/0	S-1	4		M	Topsoil on top of bedrock											
2							End of Boring at 0.6'											
3																		
4																		
5																		
6																		430.0
7																		
8																		
9																		
10																		425.0
11																		
12																		
13																		
14																		
15																		420.0
16																		
17																		
18																		
19																		
20																		415.0
21																		
22																		
23																		

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-36a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 435.0
POWER AUGER:	3 1/4"	0 TO 5.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/2/21	
CASING:		TO	WEATHER: Overcast TEMP: 75° F			DATE FINISH: 7/2/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 5.5'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	6	2	S-1	12		M	ML	6" Topsoil-like material Bwn-or CLAYEY SILT, some c-f Sand, trace c-f Gravel	
2		4							
3	78+	28 50/4	S-2	12		M	ML	6" Same	78
4						M	SM	6" GY c-f SAND, and c-f Gravel, little Silt, broken rock fragments	
5	50+	50/2	S-3	1		M	SM	Bwn-blk c-f SAND, and c-f Gravel, little Silt, rock fragments Auger refusal @ 5.5'	430.0
6									
7									
8									
9									
10									425.0
11									
12									
13									
14									
15									420.0
16									
17									
18									
19									
20									415.0
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-37

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC				7/1/21	9:30 AM	8'	DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 400.0		
POWER AUGER:	3 1/4"	0 TO 13.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks			
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/1/21			
CASING:		TO	WEATHER: Overcast TEMP: 80° F		DATE FINISH: 7/1/21			
DIAMOND CORE:		TO	DEPTH TO ROCK: 13.25'					
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)			ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				MOISTURE	1	2		3
1	2	1	S-1	8		M	GM						
2		2											
3	2	1	S-2	14		M	ML						
4		1											
5	5	2	S-3	14		W	ML						395.0
6		3											
7	23	6	S-4	16		W	ML						
8		10	S-4a			M	SM						
9													
10													390.0
11	22	15	S-5	8		M	SM						
12		10											
13	50+	11	S-6	6		M							
14		50/3											
15													385.0
16													
17													
18													
19													
20													380.0
21													
22													
23													

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-37a

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 400.0	
POWER AUGER:	3 1/4"	0 TO 4'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/1/21		
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/1/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)	
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)		
LENGTH (IN.)	RQD (%)														
1							Offset 4' east of B-37 Auger chatter @ 4' Abandoned @ 4.0' due to chatter and close proximity of utilities								
2															
3															
4															
5							End of Boring at 4'								395.0
6															
7															
8															
9															
10															390.0
11															
12															
13															
14															
15															385.0
16															
17															
18															
19															
20															380.0
21															
22															
23															

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-37b

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien	
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson	
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 400.0	
POWER AUGER:	3 1/4"	0 TO 1.5'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/1/21		
CASING:		TO	WEATHER: Overcast TEMP: 80° F			DATE FINISH: 7/1/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'			UNCONFINED COMPRESS. STRENGTH (TONS/FT) ● 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- ⊗ --- Δ --- 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT)					ELEVATION (FT.)		
			SAMPLE NUMBER	RECOV.					MOISTURE	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION (BLOWS/FT.)			
LENGTH (IN.)	RQD (%)															
1							Offset 2' east of boring B-37a Augered to 1.5' Abandoned hole due to close proximity to utilities End of Boring at 1.5'									
2																
3																
4																
5																395.0
6																
7																
8																
9																
10																390.0
11																
12																
13																
14																
15																385.0
16																
17																
18																
19																
20																380.0
21																
22																
23																

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-38

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC							DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 410.0
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			DATUM: See Remarks	
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---			DATE START: 7/1/21	
CASING:		TO	WEATHER: Clear TEMP: 80° F			DATE FINISH: 7/1/21	
DIAMOND CORE:		TO	DEPTH TO ROCK: 15.75'			UNCONFINED COMPRESS. STRENGTH (TONS/FT)	
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED			1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50	

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	7	2 3 4	S-1	6		M SM	1" Topsoil-like material Bwn c-f SAND, some Clayey Silt		
2		5 4							
3	9	4 5	S-2	4		M SM	Bwn m-f SAND, some Silt, little f Gravel		
4		5 5							
5	14	7 7 6	S-3	10		M SM	Tn-bwn c-f SAND, and Clayey Silt, little c-f Gravel	405.0	
6		6							
7									
8							Augered to 10'		
9									
10								400.0	
11	20	6 9 11	S-4	18		M SM	Bwn-gy c-f SAND, some Clayey Silt, trace c-f Gravel		
12		7							
13									
14									
15									
16	50+	13 50/3	S-5	12		M SM	Gy-bwn c-f SAND, some Clayey Silt, trace c-f Gravel, weathered SCHIST in spoon tip Spoon refusal @ 15.75'	395.0	
17							End of Boring at 15.75'		
18									
19									
20								390.0	
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-39

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/1/21	12:00 PM	7.5'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 403.0	
POWER AUGER:	3 1/4"	0 TO 15'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/1/21		
CASING:		TO	WEATHER: Clear TEMP: 80° F		DATE FINISH: 7/1/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE				
1	28	5 11 17	S-1	14		M	SM			
2		15 12								
3	45	23 22	S-2	16		M	SM			
4		16								
5	17	13 10	S-3	16		M	SM		398.0	
6		7 7	S-3a			M	ML			
7	6	4 3 3	S-4	22		W	ML			
8		3								
9	14	8 8 6	S-5	16		W	ML		393.0	
10		6								
11	27	17 12 15	S-6	12		W	SM			
12		20								
13										
14										
15									388.0	
16	20	8 10 10	S-7	16		W	SM			
17		8								
18										
19										
20								383.0		
21										
22										
23										

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-40

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/1/21	1:00 pm	4'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: 399.3
POWER AUGER:	3 1/4"	0 TO 2'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/1/21		
CASING:		TO	WEATHER: Overcast TEMP: 80° F		DATE FINISH: 7/1/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered'		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	28	24 13 15	S-1	12		M	GM	1.25" Asphalt, 4.75" subbase gravel Bwn-gy c-f GRAVEL, little c-f Sand, little Clayey Silt	
2		9							
3	11	5 6 5	S-2	24		M	ML	Gy CLAYEY SILT, little c-f Sand, trace c-f Gravel	
4		5							
5	9	4 5 5	S-3	24		W	ML	Gy-or CLAYEY SILT. little c-f Sand, trace c-f Gravel	394.3
6		3							
7	9	4 5	S-4	16		W	SM	Gy c-f SAND, some Clayey Silt, trace c-f Gravel	
8		7				W	ML	3" Gy CLAYEY SILT	
9	14	8 7 7	S-5	20		W	SM	Gy c-f SAND, some Clayey Silt, trace c-f Gravel	
10		9							389.3
11	15	5 7 8	S-6	14		W	SM	Same	
12		11							
13								End of Boring at 12'	
14									
15									384.3
16									
17									
18									
19									
20									379.3
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

BORING LOG 10983.01.GPJ TECTONIC ENG.GDT 8/13/21



PROJECT No. **10983.01**
 PROJECT: **Pocantico Hills Central School District**
 LOCATION: **Sleepy Hollow, NY**

BORING No. B-41

SHEET No. 1 of 1

CLIENT: Pocantico Central School District			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: Michael Bastien
CONTRACTOR: Core Down Drilling LLC				7/1/21	2:00 PM	5.01'	DRILLER: Billy Johnson
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: 399.3	
POWER AUGER:	3 1/4"	0 TO 10'	MON. WELL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DATUM: See Remarks		
ROT. DRILL:		TO	SCREEN DEPTH: --- TO ---		DATE START: 7/1/21		
CASING:		TO	WEATHER: Rain TEMP: 75° F		DATE FINISH: 7/1/21		
DIAMOND CORE:		TO	DEPTH TO ROCK: Not Encountered		UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X --- O --- Δ --- 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) ● 10 20 30 40 50		
GEOPROBE 7822 DT with Automatic Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BLU/6 IN.)	SAMPLES			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)				
1	23	8 12 11	S-1	12		M	SM	2" Topsoil-like material Bwn-gy c-f SAND, some c-f Gravel, little Clayey Silt	
2		8 9							
3	39	8 26 13	S-2	8		M	GM	Bwn-wh c-f GRAVEL, little c-f Sand, trace Clayey Silt	
4		10							
5	23	14 11 12	S-3	18		W	SM	Gy c-f SAND, some Clayey Silt, little c-f Gravel	394.3
6		6							
7									
8									
9									
10									389.3
11	18	11 9 9	S-4	14		W	SM	Bwn c-f SAND, some c-f Gravel, little Clayey Silt	
12		13							
13								End of Boring at 12'	
14									
15									384.3
16									
17									
18									
19									
20									379.3
21									
22									
23									

REMARKS: Surface elevations are estimated based on a Tectonic topographic survey, entitled "Boundary & Topographic Survey, Pocantico Central School District", dated 08/03/2021.

LEGEND FOR SOIL DESCRIPTION

<u>COARSE GRAINED SOIL</u> (Coarser than No. 200 Sieve)		
<u>DESCRIPTIVE TERM & GRAIN SIZE</u>		
<u>TERM</u>	<u>SAND</u> <u>GRAVEL</u>	
coarse - c	No. 4 Sieve to No. 10 Sieve 3" to 3/4"	
medium - m	No. 10 Sieve to No. 40 Sieve 3/4" to 3/16"	
fine - f	No. 40 Sieve to No. 200 Sieve	
<u>COBBLES</u> 3" to 10"	<u>BOULDERS</u> 10" +	
<u>GRADATION DESIGNATIONS</u>	<u>PROPORTIONS OF COMPONENT</u>	
fine, f	Less than 10% coarse to medium	
medium to fine, m-f	Less than 10% coarse	
medium, m	Less than 10% coarse and fine	
coarse to medium, c-m	Less than 10% fine	
coarse, c	Less than 10% medium and fine	
coarse to fine, c-f	All greater than 10%	
<u>FINE GRAINED SOIL</u> (Finer than No. 200 Sieve)		
<u>DESCRIPTION</u>	<u>PLASTICITY INDEX</u> <u>PLASTICITY</u>	
Silt	0 - 1 none	
Clayey Silt	2 - 5 slight	
Silt & Clay	6 - 10 low	
Clay & Silt	11 - 20 medium	
Silty Clay	21 - 40 high	
Clay	greater than 40 very high	
<u>PROPORTION</u>		
<u>DESCRIPTIVE TERM</u>	<u>PERCENT OF SAMPLE WEIGHT</u>	
trace	1 - 10	
little	10 - 20	
some	20 - 35	
and	35 - 50	
The primary component is fully capitalized		
<u>COLOR</u>		
Blue - blue	Gy - gray	Wh - white
Blk - black	Or - orange	Yl - yellow
Bwn - brown	Rd - red	Lgt - light
Gn - green	Tn - tan	Dk - dark
<u>SAMPLE NOTATION</u>		
S - Split Spoon Soil Sample	WOC - Weight of Casing	
U - Undisturbed Tube Sample	WOR - Weight of Rods	
C - Core Sample	WOH - Weight of Hammer	
B - Bulk Soil Sample	PPR - Compressive Strength based on Pocket Penetrometer	
NR - No Recovery of Sample	TV - Shear Strength (tsf) based on Torvane	
<u>ADDITIONAL CLASSIFICATIONS</u>		
New York City Building Code soil classifications are given in parentheses at the end of each description of material, if applicable. See sections 1804.2 of the 2008 Building Code for further details.		



1279 Route 300
 Newburgh, NY 12550
 (845) 567-6656

INFILTRATION TEST DATA

W.O. No.: 10983.01 Lot No.: _____ Date: 7/7/2021

Client: Pocantico Hills CSD/BBS Architects

Project: Pocantico Hills CSD Site Improvements

Project Engineer: Scott Cohen, PE

Inspector: Michael O'Leary

Infiltration Test Location: (see reverse) Adjacent to B-29 and B-30.

Weather Conditions: Clear Temperature: 80 - 85 F

TEST HOLE No.	TEST HOLE DEPTH	TEST HOLE DIA.		PERCOLATION TEST RUNS						STABLE RATE (in/hr)
				Drop in water levels (inches) at 1 hour intervals						
I-29	4'-11"	4"	8:30 AM		11.50	11.00	15.00	12.00		12.00
			TIME	0:00:00	1 hour	2 hours	3 hours	4 hours		

COMMENTS:
 Located 5 feet north of B-29.

I-30	4'-11"	4"	8:36 AM		13.00	12.00	11.00	12.00		12.00
			TIME	0:00:00	1 hour	2 hours	3 hours	4 hours		

COMMENTS:
 Located 5 feet north of boring B-30.

Sketch Requirements

(To Be Completed On Back of Sheet)

Indicate North	Indicate Nearest Roadway
Indicate Property Lines	Indicate Off-Sets from 2 Adjacent Property Lines

APPENDIX II

Boring #	Depth (Ft.)	Sample #	Specimen Description			USCS	Water Content	Liquid Limit	Plastic Limit	Plasticity Index	Penetrometer (tsf)	Specific Gravity	Dry Density (pcf)	Organic Content (%)	pH
			% Gravel	% Sand	% Fines										
B-25	2.0	S-2	Bwn m-f SAND, some Silt, little f Gravel				12								
			11.2	60.5	28.3										
B-28	0.0	S-1	Bwn c-f GRAVEL, some c-f Sand, little Clayey Silt				17							4.2	
B-29	0.0	S-1	Bwn SILTY CLAY, little c-f Sand, trace c-f Gravel				31							6.9	
B-30	0.0	S-1	Bwn c-f SAND, little Clayey Silt, trace c-f Gravel												5.5
B-35	2.0	S-2	Bwn-Gy m-f Sand, and Silt, some f Gravel				14								
			25.0	39.7	35.3										
B-37	2.0	S-2	Bwn SILT & CLAY				33	32	24	8					
B-38	2.0	S-2	Bwn m-f SAND, some Silt, little f Gravel				11								
			10.7	57.4	32.0										
BS-1	0.0		Bwn m-f SAND, some Silt, trace f Gravel				9								
			8.6	66.1	25.3										

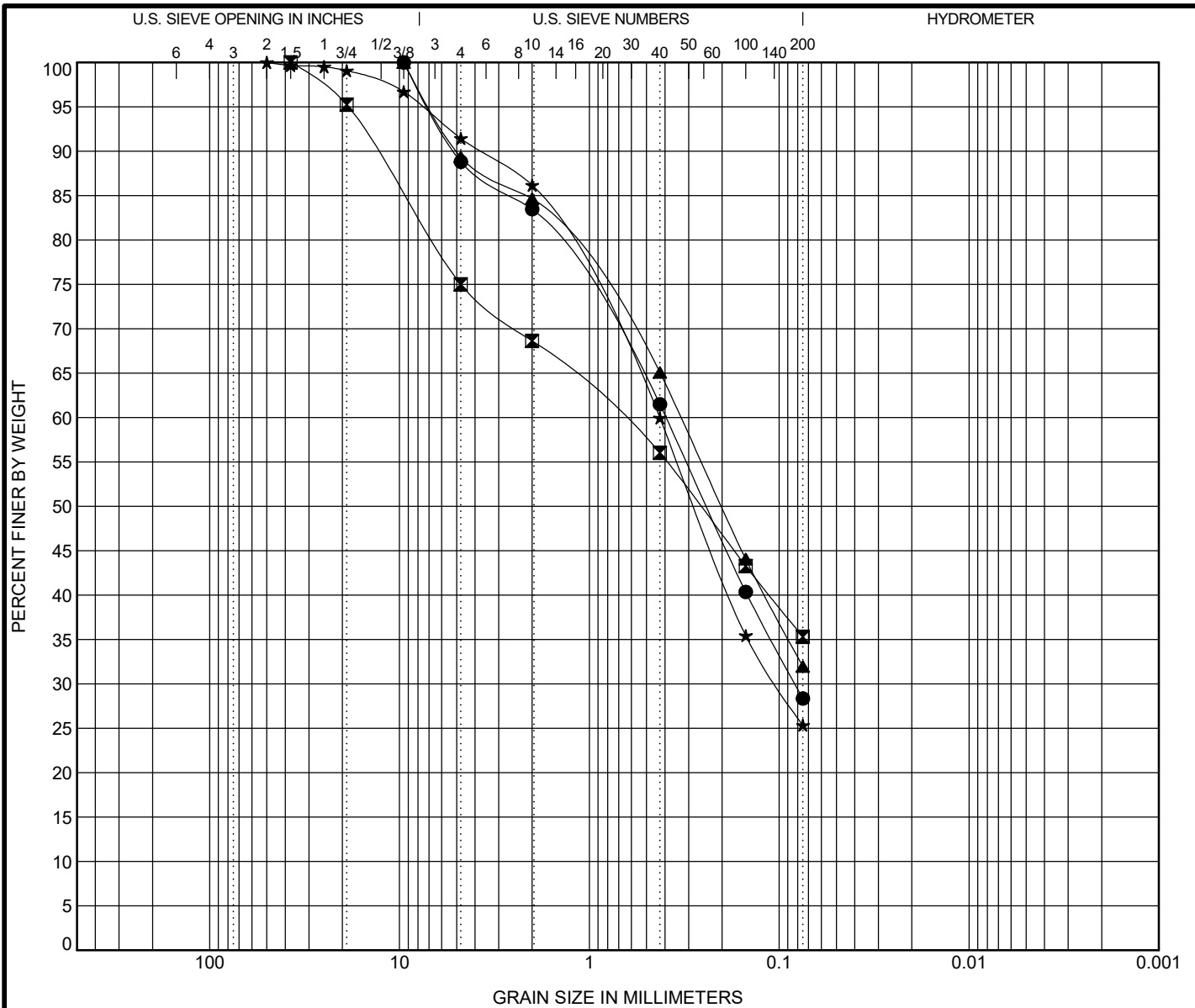
SUMMARY OF LAB BORINGS - 10983.01.GPJ TECTONIC ENG.GDT 8/5/21



280 Little Britain Road, Bldg. 2
 Newburgh, NY 12550
 Telephone: (845) 563-9081 Fax: (845) 563-9085

Summary of Laboratory Results

Project No: **10983.01** Date: **8/5/21**
 Project: **Pocantico Hills CSD**
 Location: **Sleepy Hollow, NY**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	Classification					WC%	LL	PL	PI	Cc	Cu
● B-25 2.0 S-2	Bwn m-f SAND, some Silt, little f Gravel					12.3					
☒ B-35 2.0 S-2	Bwn-Gy m-f Sand, and Silt, some f Gravel					13.6					
▲ B-38 2.0 S-2	Bwn m-f SAND, some Silt, little f Gravel					11.4					
★ BS-1 0.0	Bwn m-f SAND, some Silt, trace f Gravel					9.2					

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● B-25 2.0 S-2	9.5	0.395	0.082		11.2	60.5	28.3		Boring
☒ B-35 2.0 S-2	37.5	0.693			25.0	39.7	35.3		Boring
▲ B-38 2.0 S-2	9.5	0.33			10.7	57.4	32.0		Boring
★ BS-1 0.0	50	0.426	0.103		8.6	66.1	25.3		Athletic Baseball Field

GRAIN SIZE DISTRIBUTION 10983.01.GPJ_TECTONIC ENG.GDT 8/5/21



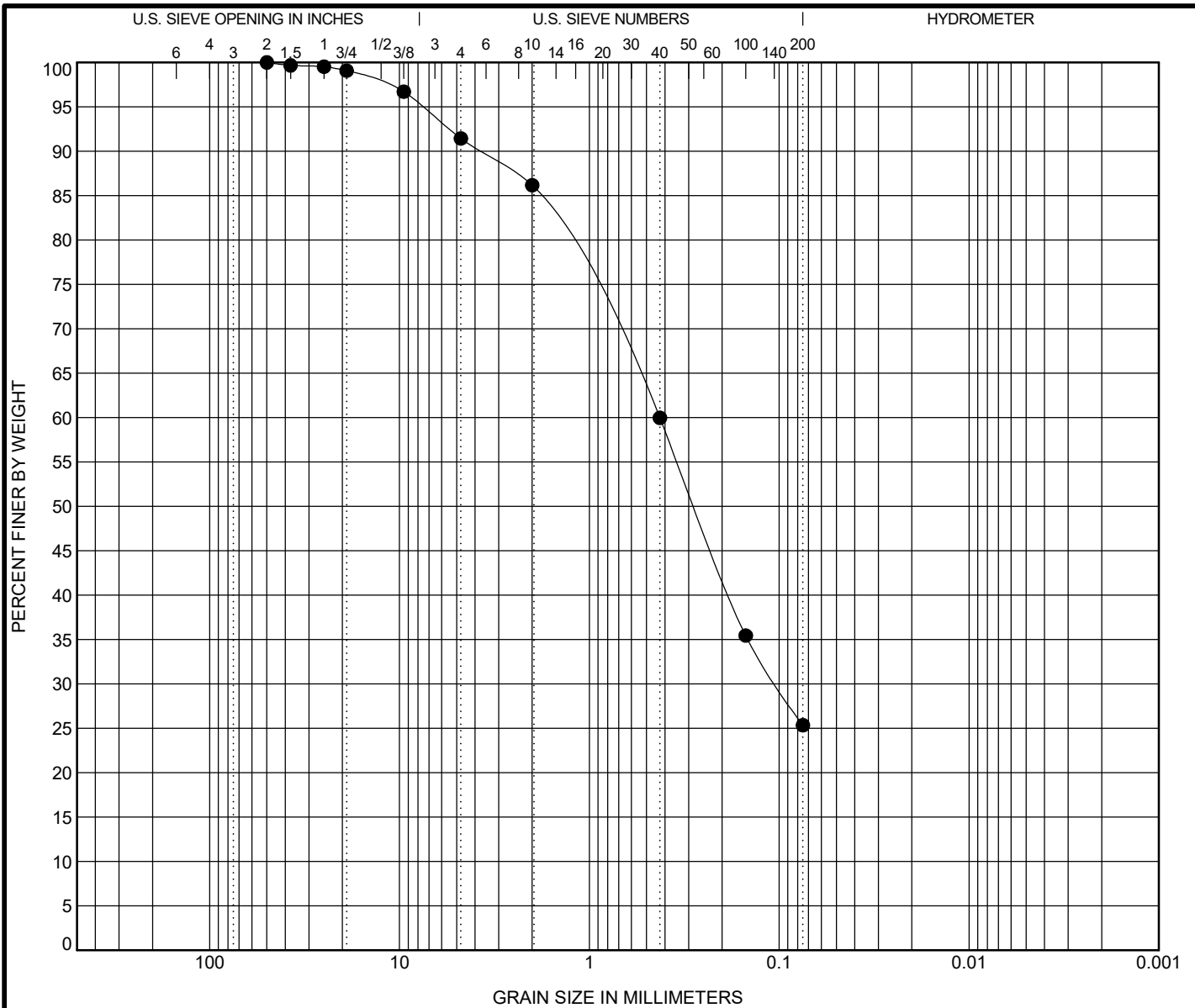
280 Little Britain Road, Bldg. 2
 Newburgh, NY 12550
 Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: 10983.01 Date: 8/5/21

Project: Pocantico Hills CSD

Location: Sleepy Hollow, NY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	Classification	WC%	LL	PL	PI	Cc	Cu
● BS-1 0.0	Bwn m-f SAND, some Silt, trace f Gravel	9.2					

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● BS-1 0.0	50	0.426	0.103		8.6	66.1	25.3		Athletic Baseball Field

GRAIN SIZE DISTRIBUTION 10983.01.GPJ TECTONIC ENG.GDT 7/26/21



280 Little Britain Road, Bldg. 2
 Newburgh, NY 12550
 Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: 10983.01 Date: 7/26/21

Project: Pocantico Hills CSD

Location: Sleepy Hollow, NY

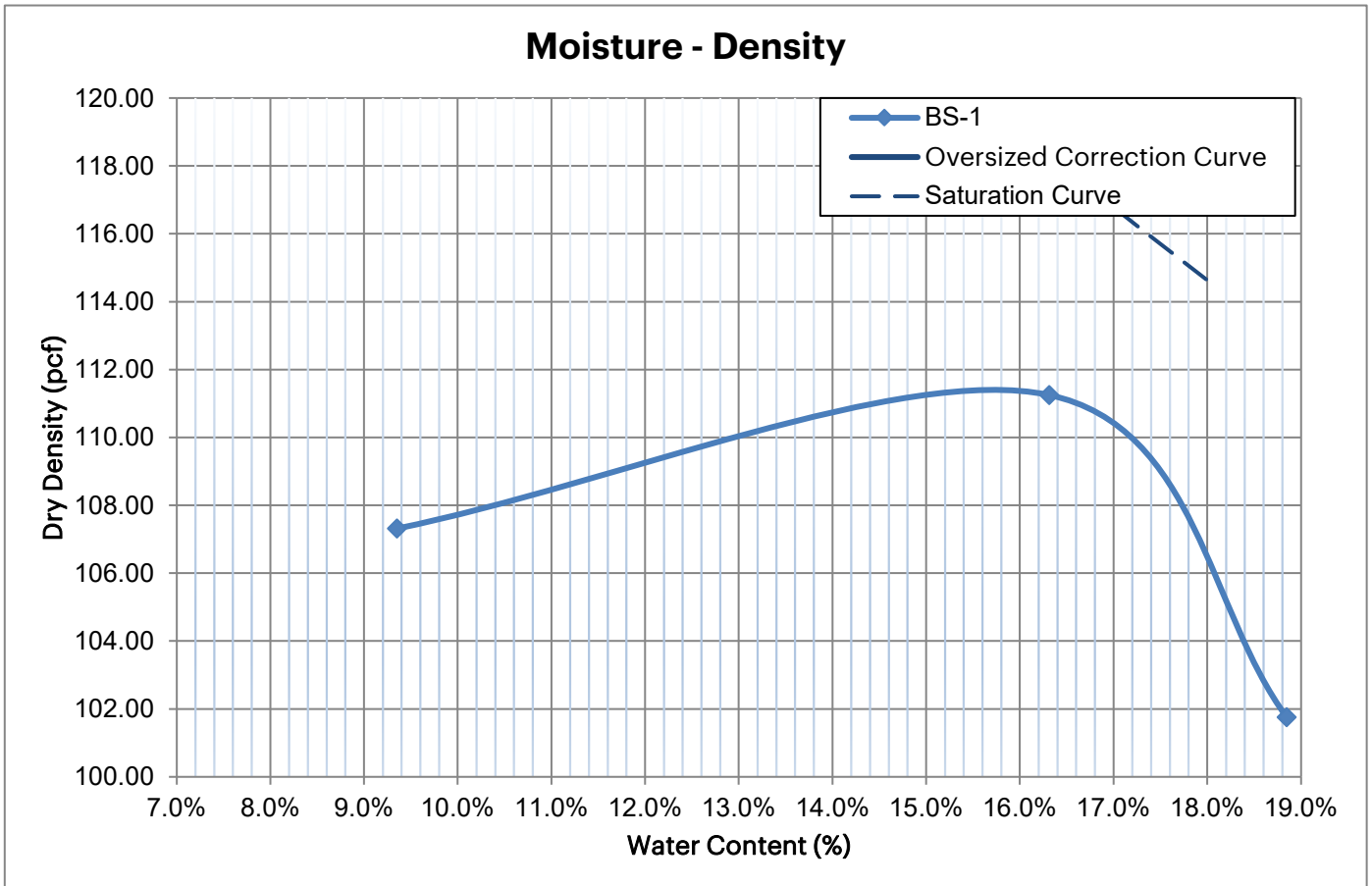
Laboratory Compaction Characteristics of Soil
ASTM D 1557/A,B,C, D 698/A,B,C

Date Sampled:	07/14/21	W.O.#:	10983.01
Date Tested:	07/15/21	Project:	Pocantico Hills CSD
Proposed Use:	Backfill	Sample ID:	BS-1
Sample Depth:	N/A	Sample Source:	Athletic Baseball Field

Sample Type:	Bwn m-f SAND, some Silt, trace f Gravel
---------------------	---

Standard/Modified	MODIFIED EFFORT	Test Method:	ASTM D1557/A,B
Sample Prep Method	Wet		
Mold Diameter (in)	4"	Max Dry Density (pcf)	111.3
Mold Volume (ft ³)	0.0333	Optimum Moisture	16.3%
Rammer Type	Mechanical		
Rammer Weight (lbs.)	10lbs.	Corrected Max Dry Density (pcf)	N/A
Rammer Drop Height (in)	18"	Corrected Optimum Moisture	N/A

Notes:



Our Story

For the past 30 years, Tectonic has delivered quality professional services in a timely and cost effective manner by pooling its talented staff into project teams that think, act, and perform as one integral unit. By carefully listening and collaborating with its clients, the firm is able to identify the key issues and assure stakeholder objectives are met in the final deliverables. Through innovating and adopting technological advances, the firm is able to generate unique solutions to improve our nation's deteriorating infrastructure and build safe sustainable communities.

As the world evolves, and its challenges grow more complex, Tectonic continues to innovate and provide the practical solutions and exceptional customer service its clients have trusted since its founding.

SECTION 00 41 13

BID FORM
(SUBMIT IN DUPLICATE)

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park, 100 HUNT Center Horseheads, NY 14845

BID SUBMITTED BY: _____

ADDRESS: _____

PHONE NUMBER: _____

E-MAIL ADDRESS: _____

FAX NUMBER: _____

FEDERAL EMPLOYER IDENTIFICATION NUMBER: _____

PROJECT NAME: Capital Improvements Project Phase 2

HUNT PROJECT NUMBER: 3288-008

OWNER: Pocantico Hills Central School District

The bidder (identified above) hereby certifies that he has examined and fully understands the requirements and intent of the BIDDING AND CONTRACT DOCUMENTS, including Drawings, Project Manual, and Addenda; and proposes to furnish all labor, materials, and equipment necessary to complete the Work on or before, the dates specified in the Contract Documents for the BASE BID sum of:

CONTRACT #:

(Refer to Section 01 10 00 Summary)

(AMOUNT IN WORDS)

(AMOUNT IN FIGURES)

SHOW AMOUNT OF BASE BID IN BOTH WORDS AND FIGURES; IN CASE OF DISCREPANCY BETWEEN WORDS AND FIGURES SHOWN, THE AMOUNT SHOWN IN WORDS WILL GOVERN.

ADDENDA

THE FOLLOWING ADDENDA HAVE BEEN RECEIVED. THE MODIFICATIONS TO THE BID DOCUMENTS NOTED BELOW HAVE BEEN CONSIDERED AND ALL COSTS ARE INCLUDED IN THE BID AMOUNT.

LIST OF ADDENDA RECEIVED

No.	Date	No.	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

ALTERNATES

Indicate in the spaces provided below the amount to be added to the BASE BID if the following ALTERNATES as described in SECTION 01 23 00 - Alternates of the Project Manual are accepted by the Owner.

Include in the amount of the ALTERNATES, all labor, materials, overhead and profit, modification of work specified in Contract Documents, and additional work required under your scope of work that may be required by acceptance of the ALTERNATE.

Include a bid amount for all ALTERNATES with work applicable under your scope of work.

Refer to INSTRUCTIONS TO BIDDERS and SECTION 01 23 00 - Alternates for additional information regarding ALTERNATES.

LIST OF ALTERNATES:

ALTERNATE ALT #1: Pavilion
ADD

(Amount in Words)

(Amount in Figures)

ALTERNATE ALT #2: Site Lighting
ADD

(Amount in Words)

(Amount in Figures)

ALTERNATE ALT #3: File Storage Area
ADD

(Amount in Words)

(Amount in Figures)

UNIT PRICES

The following are UNIT PRICES for specific portions of the work listed. Include in the amount of the UNIT PRICES, all labor, material, products, tools, equipment, plant and facilities, transportation, services and incidentals, erection, application or installation of the item of work; overhead and profit.

The amount indicated on the BID FORM is for contract purposes only if additional or lesser amount of work is required under a specific UNIT PRICE.

Include a price for all UNIT PRICES for work under your scope of work. Refer to SECTION 01 22 00 - Unit Prices of the Project Manual for additional information regarding UNIT PRICES.

UNIT PRICE NO. 1: Remedial Floor Coating System.

ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 2: Asbestos Abatement of Pipe Fitting Insulation.

ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 3: Asbestos Abatement of Pipe Insulation.

ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 4: Asbestos Abatement Floor Tile and Mastic.

ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 5: Asbestos Abatement Containment Area.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 6: Asbestos Abatement Decontamination System Enclosure.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 7: Asbestos Abatement Associated with Minor-Size Penetrations.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 8: Asbestos Abatement Associated with Small-Size Penetrations.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 9: Asbestos Abatement Associated with Large-Size Penetrations.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 10: Granular Base.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 11: Concrete Walks.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 12: Provide a new 1 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 13: Provide a new 1 1/4 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 14: Provide a new 1 1/2 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 15: Provide a new 2 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 16: Provide a new 2 1/2 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 17: Provide a new 3 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 18: Provide a new 4 inch Valve.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 19: Additional Category 6 Data Drop - Established Pathway.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 20: Additional Category 6 Data Drop - New Pathway.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 21: Additional Category 6A Data Drop - Established Pathway.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

UNIT PRICE NO. 22: Additional Category 6A Data Drop - New Pathway.
ADD/DEDUCT

(Amount in Words)

(Amount in Figures)

EXECUTION OF CONTRACT

If written notice of the acceptance of this BID is mailed, telegraphed, or otherwise delivered to the undersigned within (45) days after the date of opening of the Bids, the undersigned will, within ten (10) days after the date of such delivery, execute and deliver a contract in the form as required by the Architect.

The BID may be withdrawn at any time prior to the scheduled time for the opening of Bids, or any authorized postponement thereof.

SIGNATURE_____

NAME OF BIDDER (Corporate Name)_____

()

() SIGNATURE OF CORPORATE OFFICER_____

()

()

()

()

() DATE_____

Signature: _____

Name of Bidder: _____

END OF SECTION

SECTION 00 41 14
NON-COLLUSIVE BIDDING CERTIFICATION
(MUST BE SUBMITTED WITH BID)

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 their knowledge and belief:

- A. 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 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 knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or competitor;
- C. 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;
- D. That the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of Section 201-g of the Labor Law;
- E. The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing on its behalf;
- F. That attached hereto (if a corporate bidder) is a certified copy of a resolution authorizing the execution of this certification by the signature of this bid or proposal in behalf of the corporate bidder.

A bid shall not be considered for award nor shall any award be made where A, B, C, and D above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where A, B, and C above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency, or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition. The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of Subparagraph B, above.

CONTINUED ON NEXT PAGE

Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed to be performed or goods sold to or to be sold, where competitive bidding is required by the statute, rule, regulation, or local law, and where such bid contains the certification referred to herein, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certification as to non-collusion as the act and deed of the corporation.

INDIVIDUAL_____

CORPORATION_____

Dated:_____

By:_____

(Signature of Officer)

SECTION 00 41 15
CORPORATE RESOLUTION

Resolve that _____
Name of Individual

Be authorized to sign and submit the bid or proposal of:

Name of Corporation

For the following project: Capital Improvements Project Phase 2

CONTRACT FOR:

List Contract Type

The foregoing is a true and correct copy of the resolution by:

Name of Corporation

At a meeting of it's Board of Directors held on: _____
Date

Secretary

Seal of the Corporation

SECTION 00 41 16
FEDERAL AND STATE CERTIFICATION

INTRODUCTION:

Pursuant to Section 103, Subdivision 1-c of the New York General Municipal Law in the conduct of public bidding, the law requires the officer, board or agency of any political subdivision or of any district therein, to consider whether the putative low bidder or any substantially owned affiliated entity of the putative low bidder has been found to be in violation of any of three federal laws, specifically, the Davis-Bacon Act, the federal prevailing wage statute, the Copeland Act and the Contract Hours and Safety Standards Act which covers hours of work and safety standards in federal public contracting. If the putative low bidder is not in compliance with the named federal laws, then the Owner may not award the contract.

I, _____ the _____ of _____
(Name) (Title) (Company)

swear or affirm that the following is true:

1. The company, its principals or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.
2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principals or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.
3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.
4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____

Signature

END OF SECTION

SECTION 00 41 17
IRAN DIVESTMENT ACT CERTIFICATION

INTRODUCTION:

As a result of the Iran Divestment Act of 2012 (Act), Chapter 1 of the 2012 Laws of New York, a new provision has been added to the State Finance Law (SFL), § 165-a, effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list (prohibited entities list) of “persons” who are engaged in “investment activities in Iran” (both are defined terms in the law). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act’s effective date, at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, Bidder/Contractor (or any assignee) certifies that once the prohibited entities list is posted on the OGS website, it will not utilize on such Contract any subcontractor that is identified on the prohibited entities list.

Additionally, Bidder/Contractor is advised that once the list is posted on the OGS website, any Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to the solicitation, must certify at the time the Contract is renewed, extended or assigned that it is not included on the prohibited entities list.

During the term of the Contract, should the New York State Education Department (AGENCY) receive information that a person is in violation of the above-referenced certification, AGENCY will offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then AGENCY shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

AGENCY reserves the right to reject any bid or request for assignment for an entity that appears on the prohibited entities list prior to the award of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the prohibited entities list after contract award.

SIGNATURE: _____.

PRINT NAME: _____.

TITLE: _____.

COMPANY NAME: _____.

DATE: _____.

END OF SECTION

SECTION 00 44 00
EQUIVALENT LISTING

PRIME CONTRACT: _____

SUBMITTED BY 3 LOW BIDDERS WITHIN 72 HOURS AFTER BID OPENING

In accordance with Article 3 of Instructions to Bidders, list proposed equivalents and corresponding specified products below. Complete and submit additional copies of this form as necessary for additional products.

Attach additional sheet identifying any aspect of the Contract Documents that cannot be complied with by the manufacturer or supplier of the proposed equivalent product.

Specified Product	Equivalent Product
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Product: _____	Designation: _____
Technical Section: _____	Manufacturer: _____
Specified Section: _____	Designation: _____
Technical Section: _____	Manufacturer: _____

END OF SECTION



AIA[®]

Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

BOND AMOUNT: \$

PROJECT:

(Name, location or address, and Project number, if any)

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

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

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

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

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

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

Init.

or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

(Contractor as Principal)(Principal) *(Seal)*

(Witness)

(Title)

(Witness)

(Surety) *(Seal)*

(Title)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:43:00 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ – 2010, Bid Bond, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA[®]

Document A312[®] – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

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

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

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: None See Section 18

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

Init.

User Notes:



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/

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User Notes:

(1213681784)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:47:33 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Payment Bond, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



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Document A312[®] – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

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

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

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

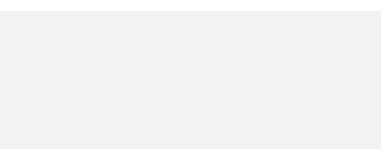
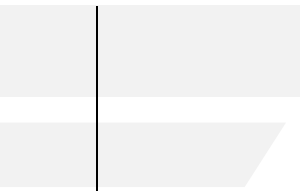
Hunt Engineers, Architects, Land
Surveyors & Landscape Architect,
DPC
Progress Plaza
1 Elizabeth Street, Suite 12

Init.

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User Notes:

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User Notes:

(1718568496)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____



Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:48:02 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Performance Bond, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA® Document A132® – 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

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)

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

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

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

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

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

LeChase
11849 East Corning Rd.
Corning, NY 14830

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

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845

The Owner and Contractor agree as follows.

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

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 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 DATES OF 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

EXHIBIT B DETERMINATION OF THE COST OF THE WORK

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 Modifications, 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 DATES OF 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 of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:

(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

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

Portion of Work	Substantial Completion Date
-----------------	-----------------------------

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:

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

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

By the following date:

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete
-----------------	-----------------------------------

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, 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 one of the following:

(Check the appropriate box.)

Stipulated Sum, in accordance with Section 4.2 below

Cost of the Work plus the Contractor’s Fee, in accordance with Section 4.3 below

Cost of the Work plus the Contractor’s Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

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

Item	Price
------	-------

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
-------------	--------------	----------------------------------

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

Item	Price
-------------	--------------

§ 4.2.4 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)
-------------	------------------------------	--------------------------------

§ 4.3 Cost of the Work Plus Contractor’s Fee without a Guaranteed Maximum Price

§ 4.3.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

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

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

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

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

§ 4.3.6 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)
-------------	------------------------------	--------------------------------

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager, within 14 days of executing this Agreement, a written Control Estimate for the Owner’s review and approval. The Control Estimate shall include the items in Section B.1 of Exhibit B, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor’s Fee with a Guaranteed Maximum Price

§ 4.4.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

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

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

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

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

§ 4.4.6 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)
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§ 4.4.7 **Guaranteed Maximum Price**

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

§ 4.4.7.2 **Alternates**

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

Item	Price
------	-------

§ 4.4.7.2.2 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
------	-------	---------------------------

§ 4.4.7.3 Allowances, if any, included in the Guaranteed Maximum Price:
(Identify each allowance.)

Item	Price
------	-------

§ 4.4.7.4 Assumptions, if any, upon which the Guaranteed Maximum Price is based:
(Identify each assumption.)

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

§ 4.4.9 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 4.4.7.4. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 4.4.7.4 and the revised Contract Documents.

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

§ 4.6 Other:

(Insert provisions for bonus, cost savings 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 Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and 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 Construction Manager not later than the fifth day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the thirtieth day of the same month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Construction Manager receives the Application for Payment.

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

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 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 Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 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.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 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.

§ 5.1.4.3.2 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 A232–2019;
- .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 A232–2019; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price

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

§ 5.1.5.2 Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.

§ 5.1.5.3 In accordance with AIA Document A232-2019 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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

- .1 The Cost of the Work as described in Exhibit B, Determination of the Cost of the Work;
- .2 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and
- .3 The Contractor's Fee computed upon the Cost of the Work described in the preceding Section 5.1.5.3.1.1 at the rate stated in Section 4.3.2; or if the Contractor's Fee is stated as a fixed sum in Section 4.3.2 an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work included in Section 5.1.5.3.1.1 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

§ 5.1.5.3.2 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 A232-2019;
- .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 A232-2019;
- .5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.5.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and
- .6 Retainage withheld pursuant to Section 5.1.7.

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

§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor, and such action shall not be deemed to be a representation that (1) the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; (2) that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.5.6 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.

§ 5.1.5.7 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price

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

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

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

§ 5.1.6.2.2 The allocation of the Guaranteed Maximum Price under this Section 5.1.6.2 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.

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

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

§ 5.1.6.4 In accordance with AIA Document A232-2019, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

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

- .1 That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;
- .2 That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and
- .4 The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

§ 5.1.6.4.2 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 A232-2019;
- .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 A232–2019;
- .5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner’s auditors in such documentation; and
- .6 Retainage withheld pursuant to Section 5.1.7.

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

§ 5.1.6.6 In taking action on the Contractor’s Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and such action shall not be deemed to be a representation that (1) the Construction Manager or Architect have made a detailed examination, audit, or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; (2) that the Construction Manager or Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner’s auditors acting in the sole interest of the Owner.

§ 5.1.6.7 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.

§ 5.1.6.8 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, 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.)

Five percent (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 when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, when the Work of this Contract is substantially complete, 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 when the Work of this Contract is substantially complete shall not include retainage as follows:

(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 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 A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

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

§ 5.2.2 Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

§ 5.2.2.1 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 A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit B, Determination of the Cost of the Work and a final Application for Payment; and
- .3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect in accordance with Exhibit B, Determination of the Cost of the Work.

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

§ 5.3 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 Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

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

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

Arbitration pursuant to Article 15 of AIA Document A232–2019.

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 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

§ 7.1.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A232–2019, 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.)

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019.

§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

§ 7.2.1 Termination

§ 7.2.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

§ 7.2.1.2 Termination by the Owner for Cause

§ 7.2.1.2.1 If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the Owner shall then only pay the Contractor an amount as follows:

- .1** Take the Cost of the Work incurred by the Contractor to the date of termination;
- .2** Add the Contractor’s Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 4.3.2 or 4.4.2, as applicable, or, if the Contractor’s Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;
- .3** Subtract the aggregate of previous payments made by the Owner; and
- .4** Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A232–2019.

§ 7.2.1.2.2 When the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, if the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232-2019, the amount, if any, to be paid to the Contractor under Article 14 of AIA Document A232-2019 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.1.2.1.

§ 7.2.1.2.3 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Contractor will contain provisions allowing for assignment to the Owner as described above.

§ 7.2.1.3 Termination by the Owner for Convenience

If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A232–2019, 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.)

§ 7.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 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 A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, 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 A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, 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 Relationship of the Parties

Where the Contract is based on the Cost of the Work plus the Contractor’s Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor’s skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner’s interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

§ 8.8 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition
- .2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit
- .3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

.5 Drawings

Number	Title	Date
<u>Exhibit "C"</u>		

.6 Specifications

Section	Title	Date	Pages
<u>Exhibit "D"</u>			

.7 Addenda, if any:

Number	Date	Pages

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

.8 Other Exhibits:

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

AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:
(Insert the date of the E235-2019 incorporated into this Agreement.)

The Sustainability Plan:

Title **Date** **Pages**

[] Supplementary and other Conditions of the Contract:

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

- .9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 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 is entered into as of the day and year first written above.

OWNER *(Signature)*

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:20:22 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A132™ – 2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA® Document A132® – 2019 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month, and year.)

for the following **PROJECT**:
(Name and location or address)

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

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

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

THE CONTRACTOR:
(Name, legal status, and address)

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

This document is intended to be used in conjunction with AIA Document A232™–2019, General Conditions of the Contract for Construction. Article 11 of A232™–2019 contains additional insurance provisions

TABLE OF ARTICLES

- A.1 GENERAL**
- A.2 OWNER’S INSURANCE**
- A.3 CONTRACTOR’S INSURANCE AND BONDS**
- A.4 SPECIAL TERMS AND CONDITIONS**

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A232™–2019, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER’S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor’s request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner’s usual general liability insurance.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder’s risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner’s property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss

Sub-Limit

§ A.2.3.1.1.1 The Insurance required by Section A.2.3.1 is not intended to cover the Contractor or Subcontractor against any loss by fire, lightning, extended coverage, all-risk, theft or vandalism and malicious mischief of any tools, equipment, vehicles, shanties, tool houses, trailers or other temporary or permanent structures, wherever located, and owned or rented by the Contractor, Subcontractor, their Employees or Agents.

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to false work and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect’s, Construction Manager’s, and Contractor’s services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage

Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner’s occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- § A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

- § A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

- § A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

- § A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

- § A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

- § A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

- § A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. *(Indicate applicable limits of coverage or other conditions in the fill point below.)*

[] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.1.1 The submittal of the certificates of insurance shall include a disclosure of any prior and/or pending claims against the submitted policies, additionally, the Contractor shall immediately make known to the Owner, any subsequent claims against the aforementioned policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. ~~located, and one to which the Owner has no reasonable objection.~~ The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than one million dollars (\$ 1,000,000) each occurrence, two million dollars (\$ 2,000,000) general aggregate, and two million dollars (\$ 2,000,000) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, or by employees of the Contractor, with policy limits of not less than one million dollars (\$ 1,000,000) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation and Disability Insurance at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than one million dollars (\$ 1,000,000) each accident, one million dollars (\$ 1,000,000) each employee, and two million dollars (\$ 2,000,000) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than two million dollars (\$ 2,000,000) per claim and six million dollars (\$ 6,000,000) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than one million dollars (\$ 1,000,000) per claim and two million dollars (\$ 2,000,000) in the aggregate.

~~§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.~~

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

~~§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.~~ five million dollars (\$ 5,000,000) per claim.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

Umbrella Liability to provide bodily injury and property damage insurance limits in excess of those limits shown herein, with policy limits of not less than five million dollars (\$5,000,000) each occurrence and five million dollars (\$5,000,000) in the aggregate, with a retained limit of ten thousand dollars (\$10,000)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[] § A.3.3.2.1 If there is only one Contractor performing the Work on the Project, property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

[] § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property.

- § A.3.3.2.3 **Asbestos Abatement Liability Insurance**, with policy limits of not less than one million dollars (\$ 1,000,000) per claim and two million dollars (\$ 2,000,000) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing ~~materials~~ materials, if the work requires such activities.
- § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.
- § A.3.3.2.6 **Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	<u>CONTRACT SUM</u>
Performance Bond	<u>CONTRACT SUM</u>

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:



AIA® Document A232® – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:

(Name, and location or address)

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

THE CONSTRUCTION MANAGER:

(Name, legal status, and address)

LeChase
11849 East Corning Rd.
Corning, NY 14830

THE OWNER:

(Name, legal status, and address)

Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591

THE ARCHITECT:

(Name, legal status, and address)

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845

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

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

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

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their 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 other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 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.

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

§ 1.1.9 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.

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

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

§ 1.4.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

1. The Agreement.
2. Addenda, with those of later date having precedence over those of earlier date.
3. Supplementary Conditions.
4. The General Conditions of the Contract for Construction.
5. Drawings and Specifications.

In case of an inconsistency between Drawings and Specifications or within other Documents not clarified by addendum the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation. The Architect's determination shall be final.

§ 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 Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, 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 Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

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

§ 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 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.3.7 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.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or 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 Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, 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 Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and 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 Whenever the Drawings show existing or other construction not required as part of the Contract Work, it is understood that it is so shown as a matter of information and that the Owner, and Architect, while believing such information to be substantially correct, assumes no responsibility thereof.

§ 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, the Construction Manager, and the 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. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager 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 the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 Where equipment lines, piping, conduit or any other systems are shown diagrammatically, the Contractor shall be responsible for the coordination and orderly arrangement of the various lines of piping, conduit, etc. included in the Work of its Contract. It shall coordinate the work of its Subcontractors and prevent all interferences between equipment, lines of piping, architectural features, etc. and avoid any unsightly arrangements in Work whether exposed or concealed. In the event there are other separate Contractors it shall also coordinate the Work of its Contract with the Work of any such separate Contractors.

§ 3.4 Labor and Materials

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

§ 3.4.1.1 Contractor shall warrant that it has good title to all materials used by them as part of the Work of this Contract. No materials or supplies shall be purchased by Contractor or any of its Subcontractors that are subject to any chattel mortgage, conditional sale or other agreement by which an interest is retained by Seller.

§ 3.4.1.2 On receipt of signed Contract, or Letter of Intent to award contract, Contractor shall place firm orders with vendors for needed materials in sufficient time to ensure delivery at such times as will ensure speedy and uninterrupted progress of the Work.

§ 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, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

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

§ 3.4.3.1 Persons whose work is unsatisfactory to the Owner or Architect, or who is reasonably considered by them to be unskilled or otherwise objectionable, may be immediately dismissed from the Project site upon notice to the Contractor. Any persons so dismissed shall be immediately replaced by the Contractor so as not to delay the progress of the Work.

§ 3.4.4 After the Contract has been executed, the Owner and Architect will consider a formal request for the substitution of products in place of those specified in the Project Specifications. The Architect will be allowed a reasonable time within which to evaluate each proposed substitution. The burden of proof regarding the merit of a substitution is on the Contractor. The Architect will be the sole judge of equivalence, and no substitute will be ordered, installed or utilized without the Architect's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. Owner may require Contractor to furnish at the Contractor's expense a special performance guarantee or other surety with respect to any substitute. The Architect will record time required by the Architect and the Architect's consultants in evaluating substitutions proposed by Contractor and in making changes in the Contract Documents occasioned thereby. Whether or not the Architect accepts a proposed substitute, Contractor shall reimburse Owner for the charges of the Architect and Architect's Consultants for evaluating each proposed substitute.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, 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 Construction Manager or 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.

.1 Any and all warranties provided herein shall be assignable to any person or entity that succeeds Owner in the ownership of the premises.

§ 3.5.3 The Contractor shall warrant all materials and operating systems to be free from any defects and faulty equipment for a minimum period of one (1) year from either (a) the date the Architect/Owner recommends final payment or (b) where the performance of materials, systems, or equipment is a condition of the Contract Documents, from the date the materials, systems or equipment performs satisfactorily and the Architect certifies the same in writing to the Owner, whichever is later.

§ 3.5.4 The Contractor shall obtain and furnish to the Architect written manufacturer's warranties for all major materials, systems and equipment. The terms of the warranty shall be as individually specified in the Contract for the item; if no term is specified, the terms shall be a minimum of one year, but not less than the period of the manufacturer's warranty for the item.

§ 3.5.5 All warranties upon any Work, labor, materials, or equipment by any subcontractor or supplier of Contractor shall be deemed made by Contractor to Owner. All factory and manufacturers' warranties shall be assigned by Contractor to Owner and all such warranty documents shall be delivered by Contractor to Owner prior to final payment by Owner hereunder; provided, however, that no such assignment of factory or manufacturers' warranties shall release or relieve Contractor from any of its warranty obligations or liability hereunder. The provisions of this subparagraph shall survive Owner's final acceptance of the Project. Contractor shall obtain the manufacturer's warranty for the plumbing, electrical, HVAC and roof systems and components and for all structural components for the longest period available, and shall obtain consent to the assignment of the same to Owner; provided, however, if such extended warranty exceeds that required by the Contract Documents, Contractor shall notify Owner thereof and of any additional cost for such extended warranty and if Owner elects to obtain such extended warranty, such excess cost shall be paid by Owner. Contractor covenants to perform the Work in such a manner as to preserve any and all such warranties.

§ 3.5.6 Neither final payment nor any provision in the Contract Documents nor partial or entire occupancy of premises by Owner shall constitute an acceptance of work not done in accordance with Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

§ 3.5.7 Upon written notice from Architect, Contractor shall remedy any defects in the Work, and pay for any damage to other Work resulting therefrom, which shall appear within a period of one (1) year, unless longer period is specified, from date of final payment for completed Work, or acceptance of any major portion of building. It is understood that Owner will notify Architect of observed defects with reasonable promptness. Notwithstanding anything to the contrary herein contained, it is understood and agreed that the foregoing warranty shall not affect, limit or impair Owner's rights against Contractor with regard to latent defects in the Work which do not appear within the applicable warranty period and which could not, by the exercise of reasonable care and due diligence, be ascertained or discovered by Owner within such warranty period provided that all claims for latent defects shall be asserted within five (5) years after Substantial Completion. Contractor shall be and remain liable and responsible to correct and cure any such latent defects which are reported to Contractor by Owner in writing within ninety (90) days after any such latent defects first appear or could, by the exercise of reasonable care and due diligence, be ascertained or discovered by Owner. Notwithstanding anything to the contrary, if Contractor fails to promptly commence and diligently perform and complete all corrective Work required hereunder, Owner shall have the right (but not the obligation) in each instance, at Owner's election, to cause such corrective Work to be done by others and recover the costs thereof, together with damages and reasonable attorneys' fees, from Contractor, in addition to all other rights and remedies available to Owner against Contractor hereunder and at law and in equity for such default by Contractor.

§ 3.5.8 Should the Contractor be required to correct any defects or damage, under the provisions of this Article, it further agrees to make good, without cost to the Owner, and subsequent defects in the work or materials furnished or built; by them, or damage due to faulty workmanship or materials in the work furnished or built by them, which occur within a one-year period after the original defect or damage is corrected or replaced, but such additional warranty shall apply only to the actual facility, material or structure initially found to be defective or damaged.

§ 3.5.9 All related components of the work under this Contract not showing defects or damage within one year of the Date of Substantial Completion shall be exempt from the additional warranty, except that the original warranty on a related component shall be extended for a period of time corresponding to the period of non-use of such component if it cannot be used due to the condition of the defective work, and/or due to the repair or replacement of such work. When required by the Owner, the Contractor shall furnish a warranty bond in the amount of fifty percent (50%) of the full amount of the contract, or such lesser amount as the Owner may specify to cover the requirements of this paragraph, and such bond, if required, shall be posted by the Contractor prior to the expiration of the One Year Warranty Period.

§ 3.5.10 In emergencies occurring during the warranty period, the Owner may correct any defect immediately and charge the cost to the Contractor. The Owner shall at once notify the Contractor, who may take over the Work and make any corrections remaining after his forces arrive at the Work. Repair work not started within seven days following notice to the Contractor of any defect may be considered an emergency.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.1 The Owner is exempt from payment of FEDERAL, STATE, LOCAL, TAXES, and from payment of SALES AND COMPENSATING USE TAXES of the State of New York and of Cities and Counties on all materials and supplies sold to the Owner pursuant to the provisions of this Contract. These taxes are not to be included in bids. This exemption does not, however, apply to tools, machinery, equipment, or other property leased by, or to the Contractor or a subcontractor; and the Contractor and its subcontractor shall be responsible for, and pay, any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and

inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.1.1 If, in connection with the Project, the Owner has obtained certain permits, licenses, or agreements from State and Federal Agencies and adjacent property owners for the Project, the Owner will furnish copies of these permits to the Contractor. It is the Contractor's responsibility to comply with any conditions or limitations placed on the Project by these permits. The Contractor shall fully cooperate with Owner in meeting the permit requirements and accommodations of regulatory inspections/directives.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. Work, except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Architect shall be responsible for monitoring Contractor's compliance with any Laws or Regulation.

§ 3.7.2.1 Owner will not be responsible for contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, labor and installation costs, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, ~~labor, installation costs~~, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without prior written notification to the Architect and Owner at least 30 days prior to the proposed date of change, and without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager,

Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.8.1 Or-equal: If in Architect's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Architect as an "or-equal" item, in which case review and approval of the proposed item may, in Architect's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

§ 3.12.8.2 Substitute Items: If in Architect's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under subparagraph 3.12.8.1, it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Architect to determine that the item of

material or equipment proposed is essentially equivalent to that named and an acceptable substitute thereof. The procedure for review by the Architect will include the following as supplemented in the General Requirements, and as Architect may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by Architect from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to Architect for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by Architect in evaluating the proposed substitute. Architect may require Contractor to furnish additional data about the proposed substitute.

§ 3.12.8.3 Contractor's Expense: All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, licensed in the State in which the project is located, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.11 The review of the shop drawings, product data and samples is an obligation of the Architect as described in subparagraph 4.2.11 of these General Conditions. The normal cost of the Architect's review is included in the Owner Architect agreement. Normal cost is hereby defined as the cost necessary to perform the original review of each shop drawing, product data, or sample and the review of one resubmittal for providing incidental information not included in the initial submission. The cost of additional review(s) or a substantial resubmittal as compared to incidental information will be the responsibility of the Contractor and the Contractor shall reimburse the Owner for any such costs charged by the Architect.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, ~~Construction Manager, Architect, Construction Manager's Owner's consultants, Architect,~~ and Architect's consultants, and agents and employees of any of them from and against claims, suits, actions, debts, damages, fines, penalties, costs, losses, charges and expenses, including but not limited to attorneys' fees, arising out of or resulting

from performance of the Work, provided that such claim, suit, action, debt damage, fine, penalty, cost, loss, charge or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions caused, in whole or in part, by the negligent acts or omissions, fault or breach of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, agents, suppliers and/or materialmen or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.1.1 The Contractor agrees to include the following indemnity provision in each and every contract it enters into with a subcontractor, and to require that subcontractor to include such provision in each contract it enters into with any lower tier subcontractor: "To the fullest extent permitted by law, Subcontractor shall indemnify and hold harmless the Contractor, Owner, Owner's consultant's, Architect, Architect's consultants, and each of their respective representatives, employees, directors, officers, and agents, from and against any and all claims, suits, actions, debts, damages, fines, penalties, costs, charges and expenses, including attorneys' fees and court costs, arising out of, relating to or resulting from the performance of this Subcontract, including, but not limited to, bodily injury or property damage, to the extent caused, in whole or in part, by acts, actions, omissions, negligence, fault or breach of the Subcontractor, its employees, agents, subcontractors, suppliers or materialmen, regardless of whether or not such claim is caused in part by a party indemnified hereunder.

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

§ 3.19 SITE CONDITIONS INVESTIGATED

§ 3.19.1 The Contractor acknowledges it has satisfied itself as to the nature and location of the Work, the general and local conditions, particularly those bearing on transportation, disposal, handling and storage of materials, availability of labor, materials, equipment, utilities, roads, weather, ground water table, character of surface and subsurface materials and conditions, the facilities needed to prosecute the Work, and all other factors which in any way affect the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint itself with the available information concerning these conditions will not relieve it from the responsibility of successfully performing work.

§ 3.20 EXISTING FEATURES AND UNDERGROUND DATA

§ 3.20.1 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 due to any unforeseen difficulties or distances encountered in the Work.

§ 3.20.2 The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. The 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 make no claim against the Owner or Architect with respect to the accuracy or completeness of such information if it is erroneous, or if the conditions found at the time of construction are different from those as indicated.

§ 3.21 CONSTRUCTION STRESSES

§ 3.21.1 The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect its usefulness, the Contractor shall be solely responsible. The Contractor shall take whatever steps necessary to strengthen, relocate or rebuild the structure to meet requirements.

§ 3.21.2 The Contractor is responsible for restoration and/or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities under this Agreement.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

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

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

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

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

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

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

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;
- .2 ~~Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed; exclusive of drill bits, saw blades, manual and power hand tools, whether incorporated or consumed; and exclusive of trucking and delivery costs including drivers time;~~
- .3 Rental costs of heavy machinery and equipment, exclusive of manual and power hand tools, whether rented from the Contractor or others; Cost shall not be allowed in excess of usual rentals charged in area for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on site is required for change in work only, cost of transporting equipment to and from site will be allowed;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 If any material previously required is omitted by written order of the Owner after it has been delivered to, or partially worked on by the Contractor, and consequently will not retain its full value for other uses, Contractor shall be allowed actual cost of omitted material, less fair market value of material, as determined by Architect.

§ 7.3.12 The allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, maximum 15 percent of the direct cost.

.2 For the Contractor, for Work performed by the Contractor's Subcontractor, maximum 7 percent of the amount due the Subcontractor.

.3 For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, maximum 15 percent of the direct cost.

.4 For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors, maximum 5 percent of the amount due the Sub-subcontractor.

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.8.

.6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the ~~Work~~ Work and to complete the Work so that it is ready for Final payment as evidenced by the Architect.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.4 In no case shall the Contractor delay the progress of the Work, or any part thereof, in response to changes in the Work or disputes caused by proposed or ordered changes in the Work, or any disputes or disagreements as to equitable value of the changes.

§ 8.2.5 If the Contractor does not achieve Substantial Completion within the Contract Time, The Contractor shall reimburse the Owner for all payments made to the Architect and the Construction Manager for services rendered by either of them required as a result of such failure by the Contractor.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of

values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

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

§ 9.3.1.3 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.2.1 Procedures required by Owner shall include, but are not necessarily limited to, submission by the Contractor to the Architect of bills of sale and bills of lading for such materials and equipment, provision of opportunity for Architect's visual verification that such materials and equipment are in fact in storage, and, if stored off-site, submission by the Contractor of verification that such materials and equipment are stored in a bonded warehouse.

§ 9.3.2.2 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction

Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the

Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor or other Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

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

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

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

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be

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

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

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 ~~Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof~~ The Date of Substantial Completion of the Project or a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use. ~~entire Project (or such portion thereof as Owner earlier elects to occupy or utilize) for the use for which it is intended.~~ Substantial Completion shall not be deemed to exist until the Owner receives a Certificate of Occupancy for the Project (or such portion as elected by Owner), and the Contractor, Architect and Owner have agreed upon a schedule to provide the Owner with all as built drawings, operating manuals and warranties. Warranties called for by the Agreement or by the Drawings and Specifications shall commence on the date of Substantial Completion of the Project or designated portion thereof, or any later date that the parties agree. This date shall be established by a Certificate of Substantial Completion signed by the Owner, Architect and Contractor.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Owner shall have the right to exclude Contractor from the Work after the date of Substantial Completion, but Owner shall allow Contractor reasonable access to complete or correct items on the tentative list.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of

Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

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

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 If the Architect is required to perform additional final inspections because the Work fails to comply with the certifications of the Contractor identified in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the final payment to the Contractor.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data

establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees. Upon demand by the Owner, Contractor shall provide and file bond for discharge of any lien, as required by Lien Law, State of New York, Section 21, Paragraph 5.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment. Owner has the right to demand such waiver in writing from Contractor as a condition to making final payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
- .4 construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings

against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of

bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is ~~located~~-located, and one to which the Owner has no reasonable objection. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

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

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

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

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

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

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

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

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

§ 12.3.1 If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Architect's recommendation of final payment, also Architects) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Architect as to reasonableness). If any such acceptance occurs prior to Architect's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

~~The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~

§ 13.1.1 The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.1.2 Each and every provision required by law to be made a part of this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though all such provisions were included herein. Upon request of either party, this Contract shall be physically amended to properly show each such provision found not inserted or found incorrectly inserted.

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 Any materials to be furnished shall be subject to inspections and tests in the shop and field by the Architect. Shop inspection shall not relieve the Contractor of the responsibility to furnish satisfactory materials, and the right is reserved to reject any material at any time before final acceptance of the Work, when in the opinion of the Architect the materials and workmanship do not conform to the Specification requirements.

§ 13.4.8 Test specimens will be submitted to an independent laboratory designated by the Architect. Test data will be furnished to the Contractor by the Architect.

§ 13.5 Interest

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

§ 13.6 CONTRACT DEEMED EXECUTORY

§ 13.6.1 The Contractor agrees that the Contract shall be deemed executory to the extent of the monies available and that no liability shall be incurred by the Owner beyond the monies available therefor. The Contractor is entitled to request of the Owner documentation sufficient to evidence appropriate financing of the Project.

§ 13.7 USE OR OCCUPANCY OF BUILDING BY OWNER

§ 13.7.1 Contractors shall cooperate with Owner in order to make portions of project available as soon as possible.

§ 13.7.2 Site and building, whether work of various Contractors is partially or fully completed or not, is property of Owner who shall have certain rights and privileges in connection with use of same, including the following:

.1 Should there be, in the opinion of the Architect, unwarranted delay on the part of any Contractor in completion of incomplete or defective Work or other Contract requirements, and Architect so certifies, Owner may have full or partial use and occupancy of any or all portions of buildings as required for moving in or installing furniture, fixtures, supplies, or equipment and for general cleaning and maintenance work. In such event, Contractor whose unfinished Work is performed subsequent to installation of furniture, fixtures, equipment, etc., shall be responsible for the prevention of any damage to such installation. Such use or occupancy by Owner shall in no instance constitute acceptance of any portion of the Work.

§ 13.8 MINIMUM RATE OF WAGE AND SUPPLEMENT

§ 13.8.1 The minimum hourly wage rates (including supplements) to be paid shall not be less than that designated by the New York State Department of Labor, Bureau of Public Works and any redetermination of the prevailing rate of wages after the Contract is approved shall be deemed to be incorporated herein by reference as of the effective date of redetermination and shall form a part of these Contract Documents.

§ 13.9 Assignment of Public Contracts

§ 13.9.1 As provided in Section 109 of the General Municipal Law, the Contractor is prohibited from assigning, transferring, conveying, subletting or otherwise disposing of the Contract, or of Contractor's right title, or interest therein, or his power to execute such contract to any other person or corporation without the previous consent in writing of the officer, board or agency awarding the contract.

§ 13.9.2 If any contractor, to whom any contract is let, granted and awarded, as required by law, by any officer, board or agency in a political subdivision, or of any district therein, shall without the previous written consent specified herein, assign, transfer, convey, sublet or otherwise dispose of such contract, or his right, title or interest therein, or his power to execute such contract, to any other person or corporation, the officer, board or agency which let, made, granted, or awarded such contract shall revoke and annul such contract, and the political subdivision or district therein, as the case may be, and such officer, board or agency shall be relieved and discharged from any and all liability and obligations growing out of such contract to such contractor, and to the person or corporation to which such contract shall have been assigned, transferred, conveyed, sublet or otherwise disposed of, and such contractor, and his assignees, transferees or sublessees shall forfeit and lose all moneys, theretofore earned under such contract, except so much as may be required to pay his employees. The provisions of this section shall not hinder, prevent, or affect an assignment by any such contractor for the benefit of his creditors made pursuant to the laws of this state.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such ~~termination-termination~~ and damages on the Work performed to the date of termination; but Contractor shall make no Claim nor seek to recover overhead, lost anticipated profit or damages in contract for Work not performed by Contractor..

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

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

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

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

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

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.3.3 All written claims for damages or extra work shall include time of occurrence, location and other identifying factors and shall be supported if so required by Architect, by letters, journals, or diaries, instructions, vouchers, or other pertinent or applicable records.

§ 15.1.3.4 Owner shall not be liable to any Contractor or Subcontractor for damages caused by any breach of Contract, delay in performance or other act of neglect by other Contractors or Subcontractors having Contracts for performance of any portion of work.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 **Claims for Additional Cost.** If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.7 **Waiver of Claims for Consequential Damages.** The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker

and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 Mediation

~~§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution. The parties hereto at the time any claim or dispute arises between them may, in their sole personal discretion, agree to submit the same to non-bonding mediation upon such terms and conditions as may be agreed at the time; but the decision to do so must be unanimous between them and must be in writing in advance thereof. The request for mediation is not to be deemed a condition precedent to any other right or remedy of the aggrieved party, all of which rights and remedies are expressly reserved by the parties.~~

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

60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

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

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

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

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:27:31 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA® Document A305® – 2020

Contractor's Qualification Statement

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

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

TYPE OF WORK TYPICALLY PERFORMED

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

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

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:

(Check all that apply.)

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

CONTRACTOR CERTIFICATION

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

Organization's Authorized Representative **Date**
Signature

Printed Name and Title

NOTARY

State of:

County of:

Signed and sworn to before me this day of

Notary Signature

My commission expires:

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:36:02 ET on 11/08/2023 under Order No. 3104238744 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A305™ – 2020, Contractor's Qualification Statement, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA® Document A305® – 2020 Exhibit A

General Information

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

§ A.1 ORGANIZATION

§ A.1.1 Name and Location

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

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

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

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

§ A.1.2 Legal Status

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

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

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

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

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

§ A.1.3 Other Information

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

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

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

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

§ A.2 EXPERIENCE

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

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

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

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

§ A.3 CAPABILITIES

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

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

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

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

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

§ A.4 REFERENCES

§ A.4.1 Identify three client references:

(Insert name, organization, and contact information)

§ A.4.2 Identify three architect references:

(Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference:

(Insert name, organization, and contact information)

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

(Insert name, organization, and contact information)



Financial and Performance Information

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

§ B.1 FINANCIAL

§ B.1.1 Federal tax identification number:

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

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

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

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS

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

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

- .1 failed to complete work awarded to it?
- .2 been terminated for any reason except for an owners’ convenience?

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

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

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

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

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

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

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



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Document A305[®] – 2020 Exhibit C

Project Specific Information

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

PROJECT:

(Name and location or address.)

Pocantico Hills CSD - Capital Improvements Phase 2
Pocantico Hills Central School District
599 Bedford Road
Sleepy Hollow, NY 10591
HUNT #: 3288-008

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

CONTRACTOR’S PROJECT OFFICE:

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

TYPE OF WORK SOUGHT

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

CONFLICT OF INTEREST

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

§ C.1 PERFORMANCE OF THE WORK

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

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

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

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office

location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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

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

§ C.2 EXPERIENCE RELATED TO THE PROJECT

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

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

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

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

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

§ C.3 SAFETY PROGRAM AND RECORD

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

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

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

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

§ C.4 INSURANCE

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

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, or AIA Document A132-2019, Exhibit A, as applicable, Insurance A.3.2.2.2? If so, identify.

§ C.5 SURETY

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

§ C.5.2 Surety company name:

§ C.5.3 Surety agent name and contact information:

§ C.5.4 Total bonding capacity:

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



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Contractor's Past Project Experience

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



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Contractor's Past Project Experience, Continued

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

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)

PRODUCER	THIS CERTIFICATE ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
	INSURERS AFFORDING COVERAGE
INSURED	INSURER A:
	INSURER B:
	INSURER C:
	INSURER D:
	INSURER E:

COVERAGES

THE POLICES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INS LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXP DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY <input type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR <input type="checkbox"/> _____ <input type="checkbox"/> _____ GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC				EACH OCCURRENCE	\$
					FIRE DAMAGE (any 1 fire)	\$
					MED EXP (any 1 person)	\$
					PERSONAL & ADV INJURY	\$
					GENERAL AGGREGATE	\$
					PRODUCTS – COMP/OP AGG	\$
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON OWNED AUTOS <input type="checkbox"/> _____ <input type="checkbox"/> _____				COMBINED SINGLE LIMIT (Ea Accident)	
					BODILY INJURY (per person)	\$
					BODILY INJURY (per accident)	\$
					PROPERTY DAMAGE (Per accident)	\$
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> _____				AUTO ONLY – EA ACCIDENT	\$
					OTHER THAN AUTO ONLY	EA ACC \$ AGG \$
	EXCESS LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$ _____				EACH OCCURRENCE	\$
					AGGREGATE	\$
						\$
						\$
	WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY				<input type="checkbox"/> WC Statutory Limits <input type="checkbox"/> Other	
					E.L. EACH ACCIDENT	\$
					E.L. DISEASE –EA EMPLOYEE	\$
					E.L. DISEASE –POLICY LIMIT	\$
					.	

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS:
 .

CERTIFICATE HOLDER **[N]** ADDITIONAL INSURED; INSURER LETTER: _____ CANCELLATION

	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.
	AUTHORIZED REPRESENTATIVE



AIA® Document G715™ – 2017

Supplemental Attachment for ACORD Certificate of Insurance 25

PROJECT: <i>(name and address)</i> «Pocantico Hills CSD - Capital Improvements Phase 2» «Pocantico Hills Central School District» «599 Bedford Road» «Sleepy Hollow, NY 10591» «HUNT #: 3288-008»	CONTRACT INFORMATION: Contract For: Date:	CERTIFICATE INFORMATION: Producer: Insured: Date:
OWNER: <i>(name and address)</i> «Pocantico Hills Central School District» «599 Bedford Road» «Sleepy Hollow, NY 10591»	ARCHITECT: <i>(name and address)</i> « Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC» «Airport Corporate Park» «100 Hunt Center» «Horseheads, NY 14845»	CONTRACTOR: <i>(name and address)</i>

A. General Liability	Yes	No	N/A
1. Does this policy include coverage for:			
a Damages because of bodily injury, sickness, or disease, including occupational sickness or disease, and death of any person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b Personal injury and advertising injury?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c Damages because of physical damage to or destruction of tangible property, including the loss of use of such property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d Bodily injury or property damage arising out of completed operations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e The Contractor's indemnity obligations included in the Contract Documents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Does this policy contain an exclusion or restriction of coverage for:			
a Claims by one insured against another insured, where the exclusion or restrictions is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c Claims for bodily injury other than to employees of the insured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d Claims for the Contractor's indemnity obligations included in the Contract Documents arising out of injury to employees of the insured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e Claims for loss excluded under a prior work endorsement or other similar exclusionary language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g Claims related to residential, multi-family, or other habitational projects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h Claims related to roofing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i Claims related to exterior insulation finish systems, synthetic stucco, or similar exterior coatings or surfaces?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j Claims related to earth subsistence or movement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k Claims related to explosion, collapse, and underground hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. Other Insurance Coverage	Yes	No	N/A
1. Indicate whether the Contractor has the following insurance coverages and, if so, indicate the coverage limits for each.			

- a Professional liability insurance
 Coverage limits:
- b Pollution liability insurance
 Coverage limits:
- c Insurance for maritime liability risks associated with the operation of a vessel
 Coverage limits:
- d Insurance for the use or operation of manned or unmanned aircraft
 Coverage limits:
- e Property insurance
 Coverage limits:
- f Railroad protective liability insurance
 Coverage limits:
- g Asbestos abatement liability insurance
 Coverage limits:
- h Insurance for physical damage to property while it is in storage and in transit to
 the construction site
 Coverage limits:
- i Other:

(Authorized Representative)

(Date of Issue)



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Pocantico Hills CSD
Lisa Crance, Project Administrator
Airport Corporate Park
100 Hunt Center
Horseheads NY 14845

Schedule Year 2023 through 2024
Date Requested 11/08/2023
PRC# 2023013310

Location Pocantico Hills CSD
Project ID# 3288-008
Project Type Additions and Alterations for classroom, Office, Kitchen, Cafeteria and Fitness Center upgrades, including general trades, mechanical, electrical and plumbing work. Sitework included for additions

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2023 through June 2024. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission; a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion [online](#).

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule from the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12226; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment. Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed \$100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds \$25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYS DOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "[Public Work Project](#)" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12226 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of \$50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Pocantico Hills CSD
Lisa Crance, Project Administrator
Airport Corporate Park
100 Hunt Center
Horseheads NY 14845

Schedule Year 2023 through 2024
Date Requested 11/08/2023
PRC# 2023013310

Location Pocantico Hills CSD
Project ID# 3288-008
Project Type Additions and Alterations for classroom, Office, Kitchen, Cafeteria and Fitness Center upgrades, including general trades, mechanical, electrical and plumbing work. Sitework included for additions

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information

All information must be supplied

Federal Employer Identification Number: _____		
Name: _____		
Address: _____ _____		
City: _____	State: _____	Zip: _____
Amount of Contract: \$ _____	Contract Type:	
Approximate Starting Date: ____/____/____	<input type="checkbox"/> (01) General Construction	
Approximate Completion Date: ____/____/____	<input type="checkbox"/> (02) Heating/Ventilation	
	<input type="checkbox"/> (03) Electrical	
	<input type="checkbox"/> (04) Plumbing	
	<input type="checkbox"/> (05) Other : _____	

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to \$1,500 for a first offense and up to \$5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, <https://dol.ny.gov/public-work-and-prevailing-wage>

If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

Effective June 23, 2020

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage and supplement rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website www.labor.ny.gov or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

**To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND**

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

**To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND**

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12226

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

Required Notice under Article 25-B of the Labor Law

**Attention All Employees, Contractors and Subcontractors:
You are Covered by the Construction Industry Fair Play Act**

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor, **you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

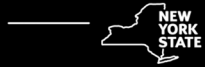
Penalties for paying workers off the books or improperly treating employees as independent contractors:

- **Civil Penalty** First offense: Up to \$2,500 per employee
 Subsequent offense(s): Up to \$5,000 per employee
- **Criminal Penalty** First offense: Misdemeanor - up to 30 days in jail, up to a \$25,000 fine and debarment from performing public work for up to one year.
 Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a \$50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)



Attention Employees

THIS IS A: **PUBLIC WORK PROJECT**

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Your pay stub and wage notice received upon hire must clearly state your wage rate and supplement rate.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at:
<https://dol.ny.gov/bureau-public-work>



If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5287		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is \$250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.*)
- Training roster, attendance record or other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is \$3 million in Bronx, Kings, New York, Queens and, Richmond counties; \$1.5 million in Nassau, Suffolk and Westchester counties; and \$500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirements on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Rofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12226

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Westchester County General Construction

Boilermaker **11/01/2023**

JOB DESCRIPTION Boilermaker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2023	01/01/2024
Boilermaker	\$ 65.88	\$ 67.38
Repairs & Renovations	65.88	67.38

Repairs & Renovation: Includes Repairing, Renovating replacement of parts to an existing unit(s).

SUPPLEMENTAL BENEFITS

Per Hour:

Boilermaker	33.5% of hourly	33.5% of Hourly
Repair \$ Renovations	Wage Paid	Wage Paid
	+ \$ 26.49	+ \$26.85

NOTE: "Hourly Wage Paid" shall include any and all premium(s) pay.

Repairs & Renovation Includes replacement of parts and repairs & renovation of existing unit.

OVERTIME PAY

See (*B, O, **U) on OVERTIME PAGE

Note:* Includes 9th & 10th hours, double for 11th or more.

** Labor Day ONLY, if worked.

Repairs & Renovation see (B,E,Q) on OT Page

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 12, 15, 25, 26, 29) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:

(1/2) Year Terms at the following percentage of Boilermaker's Wage

1st	2nd	3rd	4th	5th	6th	7th
65%	70%	75%	80%	85%	90%	95%

Supplemental Benefits Per Hour:

Apprentice(s)	33.5% of Hourly Wage Paid Plus Amount Below	33.5% of Hourly Wage Paid Plus Amount Below
1st Term	\$ 20.12	\$ 20.36
2nd Term	21.03	21.28
3rd Term	21.95	22.22
4th Term	22.83	23.12
5th Term	23.76	24.07
6th Term	24.67	25.00
7th Term	25.58	25.93

NOTE: "Hourly Wage Paid" shall include any and all premium(s)

4-5

Carpenter **11/01/2023**

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2023

Piledriver \$ 59.16
+ 9.79*

Dockbuilder \$ 59.16
+ 9.79*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 45.34

OVERTIME PAY

See (B, E2, O) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.

Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour

(1)year terms:

	1st	2nd	3rd	4th
	\$25.60	\$31.20	\$39.58	\$47.97
	+ 5.30*	+ 5.30*	+ 5.30*	+ 5.30*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

All Terms: \$ 31.83

8-1556 Db

Carpenter

11/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2023

Carpet/Resilient

Floor Coverer \$ 55.05
+ 8.25*

*This portion is not subject to overtime premiums

INCLUDES HANDLING & INSTALLATION OF ARTIFICIAL TURF AND SIMILAR TURF INDOORS/OUTDOORS.

SUPPLEMENTAL BENEFITS

Per hour:

\$ 39.45

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE.

Paid for 1st & 2nd yr.

Apprentices See (5,6,11,13,16,18,19,25)

Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wage per hour - (1) year terms:

	1st	2nd	3rd	4th
	\$ 25.20	\$ 28.20	\$ 32.45	\$ 40.33

+ 1.85* + 2.35* + 2.85* + 3.85*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

	1st	2nd	3rd	4th
	\$ 15.22	\$ 16.22	\$ 19.32	\$ 20.32

8-2287

Carpenter

11/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour: 07/01/2023

Marine Construction:

Marine Diver \$ 74.03
 + 9.79*

Marine Tender \$ 53.57
 + 9.79*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 45.34

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Overtime: See (5, 6, 10, 11, 13, 16, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms.

1st year	\$ 25.60
	+ 5.30*
2nd year	31.20
	+ 5.30*
3rd year	39.58
	+ 5.30*
4th year	47.97
	+ 5.05*

*This portion is not subject to overtime premiums

Supplemental Benefits

Per Hour:

All terms \$ 31.83

8-1456MC

Carpenter

11/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per hour: 07/01/2023

Building
 Millwright \$ 58.70
 + 12.62*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Millwright \$ 44.31

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18,19) on HOLIDAY PAGE.

Overtime See (5,6,8,11,13,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
\$31.74	\$37.19	\$42.64	\$53.54
+ 6.75*	+ 7.92*	+ 9.09*	+ 11.43*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
\$29.81	\$32.34	\$35.52	\$39.94

8-740.1

Carpenter

11/01/2023

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:

07/01/2023

Timberman \$ 54.05
 + 10.26*

*This portion not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2023

\$ 44.55

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE.

Paid: for 1st & 2nd yr.

Apprentices See (5,6,11,13,25)

Overtime: See (5,6,11,13,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st	2nd	3rd	4th
\$23.42	\$28.53	\$36.18	\$43.84
+ 5.55*	+ 5.55*	+ 5.55*	+ 5.55*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:
 All terms \$ 31.54

8-1556 Tm

Carpenter **11/01/2023**

JOB DESCRIPTION Carpenter **DISTRICT 8**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Westchester

PARTIAL COUNTIES
 Orange: South of but including the following, Waterloo Mills, Slate Hill, New Hampton, Goshen, Blooming Grove, Mountainville, east to the Hudson River.
 Putnam: South of but including the following, Cold Spring, TompkinsCorner, Mahopac, Croton Falls, east to Connecticut border.
 Suffolk: West of Port Jefferson and Patchogue Road to Route 112 to the Atlantic Ocean.

WAGES
 Per hour: 07/01/2023

Core Drilling:
 Driller \$ 43.88
 + 2.50*

Driller Helper \$ 34.47
 + 2.50*

Note: Hazardous Waste Pay Differential:
 For Level C, an additional 15% above wage rate per hour
 For Level B, an additional 15% above wage rate per hour
 For Level A, an additional 15% above wage rate per hour
 Note: When required to work on water: an additional \$ 3.00 per hour.

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS
 Per hour:
 Driller and Helper \$ 28.85

OVERTIME PAY
 See (B, G, P) on OVERTIME PAGE

HOLIDAY
 Paid: See (5, 6) on HOLIDAY PAGE
 Overtime: See (5, 6) on HOLIDAY PAGE

8-1536-CoreDriller

Carpenter - Building / Heavy&Highway **11/01/2023**

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT 11**

ENTIRE COUNTIES
 Putnam, Rockland, Westchester

WAGES
 WAGES:(per hour)
 Applies to CAPRENTER BUILDING/HEAVY & HIGHWAY/TUNNEL:

	07/01/2023	07/01/2024	07/01/2025	07/01/2026
Base Wage	\$ 39.80	Additional \$ 1.25**	Additional \$ 1.25**	Additional \$ 1.25**
	+\$6.71*			

*For all hours paid straight or premium.
 **To be allocated at a later date.

SHIFT DIFFERENTIAL: When it is mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of wage plus applicable benefits.

SUPPLEMENTAL BENEFITS
 Per hour:

Journeyworker \$ 33.22

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

BUILDING:

Paid: See (1) on HOLIDAY PAGE.

Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE.

- Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:

Paid: See (5, 6, 25) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

- Holidays that fall on Sunday will be observed Monday

- Must be employed during the five (5) work days immediately preceding a holiday or during the five (5) work days following the paid holiday to receive holiday pay

- If Employee is entitled to a paid holiday, the Employee is paid the Holiday wage and supplemental benefits whether they work or not. If Employee works the Holiday, the Employee will receive holiday pay (including supplemental benefits), plus the applicable premium wage for working the Holiday. If Employee works in excess of 8 hours on Holiday, then benefits will be paid for any hours in excess of 8 hours.

REGISTERED APPRENTICES

1 year terms at the following wage rates:

1st	2nd	3rd	4th	5th
\$ 19.90	\$ 23.88	\$ 25.87	\$ 27.86	\$ 31.84
+3.58*	+3.58*	+3.58*	+3.58*	+3.58*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms \$ 16.27

11-279.1B/HH

Electrician

11/01/2023

JOB DESCRIPTION Electrician

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond, Westchester

WAGES

Per hour: 07/01/2023 03/07/2024

Service Technician \$ 36.40 \$ 37.40

Service and Maintenance on Alarm and Security Systems.

Maintenance, repair and /or replacement of defective (or damaged) equipment on, but not limited to, Burglar - Fire - Security - CCTV - Card Access - Life Safety Systems and associated devices. (Whether by service contract of T&M by customer request.)

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker: \$ 21.07 \$ 21.85

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

9-3H

Electrician

11/01/2023

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour: 07/01/2023 04/18/2024 04/17/2025

*Electrician/A-Technician \$ 55.75 \$ 56.75 \$ 58.75

Teledata	55.75	56.75	58.75
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*All new installations of wiring, conduit, junction boxes and light fixtures for projects with a base bid of more than \$325,000. For projects with a base bid of \$325,000 or less, see Maintenance and Repair rates.

Note: On a job where employees are required to work on bridges over navigable waters, transmission towers, light poles, bosun chairs, swinging scaffolds, etc. 40 feet or more above the water or ground or under compressed air, or tunnel projects under construction or where assisted breathing apparatus is required, they will be paid at the rate of time and one-half for such work except on normal pole line or building construction work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 56.26	\$59.39	\$61.09
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OVERTIME PAY

See (A, G, *J, P) on OVERTIME PAGE

*NOTE: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

	07/01/2023	04/18/2024	04/17/2025
1st term	\$ 16.00	\$16.00	\$16.00
2nd term	17.00	17.00	17.00
3rd term	19.00	19.00	19.00
4th term	21.00	21.00	21.00
MIJ 1-12 months	26.50	26.50	26.50
MIJ 13-18 months	30.00	30.00	30.00

Supplemental Benefits per hour:

	07/01/2023	04/18/2024	04/17/2025
1st term	\$ 11.63	\$ 12.40	\$ 12.72
2nd term	14.30	15.07	15.89
3rd term	15.62	16.40	17.23
4th term	16.95	17.73	18.57
MIJ 1-12 months	13.92	15.72	15.89
MIJ 13-18 months	14.33	16.17	16.29

8-3/W

Electrician

11/01/2023

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour

	07/01/2023	04/18/2024	04/17/2025
Electrician -M	\$ 30.00	\$ 30.00	\$ 30.00
H - Telephone	30.00	30.00	30.00

All work with a base bid amount of \$325,000 or less. Including repairs and /or replacement of defective electrical and teledata equipment, all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls, and washing and cleaning of foregoing fixtures.

*If the project exceeds \$375,000 due to changes in the scope of work, an Electrician/A Technician must be part of the labor ratio.

SUPPLEMENTAL BENEFITS

	07/01/2023	04/18/2024	04/17/2025
Electrician & H - Telephone	\$ 14.33	\$ 16.17	\$ 16.29

OVERTIME PAY

See (B, G, *J, P) on OVERTIME PAGE

*Note: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Elevator Constructor

11/01/2023

JOB DESCRIPTION Elevator Constructor

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk

PARTIAL COUNTIES

Rockland: Entire County except for the Township of Stony Point

Westchester: Entire County except for the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per hour:

07/01/2023

Elevator Constructor \$ 77.49

Modernization & Service/Repair \$ 60.89

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per Hour:

Elevator Constructor \$ 45.574

Modernization & Service/Repairs 44.412

OVERTIME PAY

Constructor See (D, M, T) on OVERTIME PAGE.

Modern/Service See (B, F, S) on OVERTIME PAGE.

HOLIDAY

Paid: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES PER HOUR:

*Note:1st, 2nd, 3rd Terms are based on Average wage of Constructor & Modernization.

Terms 4 thru 9 Based on Journeyman's wage of classification Working in.

6 MONTH TERMS:

1st Term* 50%	2nd & 3rd Term* 50%	4th & 5th Term 55%	6th & 7th Term 65%	8th & 9th Term 75%
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SUPPLEMENTAL BENEFITS

Elevator Constructor

1st Term	\$ 0.00
2nd & 3rd Term	36.024
4th & 5th Term	36.943
6th & 7th Term	38.448
8th & 9th Term	39.953

Modernization & Service/Repair

1st Term	\$ 0.00
2nd & 3rd Term	35.694
4th & 5th Term	36.525
6th & 7th Term	37.948
8th & 9th Term	39.38

Elevator Constructor

11/01/2023

JOB DESCRIPTION Elevator Constructor

DISTRICT 1

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Towns of Andes, Bovina, Colchester, Davenport, Delhi, Harpersfield, Hemdon, Kortright, Meredith, Middletown, Roxbury, Hancock & Stamford

Rockland: Only the Township of Stony Point.

Westchester: Only the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per Hour	07/01/2023	01/01/2024
Mechanic	\$ 67.35	\$ 70.15
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour	07/01/2023	01/01/2024
Journeyman/Helper	\$ 37.335*	\$ 37.885*

(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 16) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE

Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

Wages per hour:

0-6 mo*	6-12 mo	2nd yr	3rd yr	4th yr
50 %	55 %	65 %	70 %	80 %

(*)Plus 6% of the hourly rate, no additional supplemental benefits.

Supplemental Benefits per hour worked:

Same as Journeyman/Helper

1-138

Glazier

11/01/2023

JOB DESCRIPTION Glazier

DISTRICT 8

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per hour:	7/01/2023
Glazier & Glass Tinting	\$ 61.64
*Scaffolding	65.64
Window Film	
**Repair & Maintenance	30.76

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 30' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative Repair & Maintenance contract value is under \$184,000.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2023
Glazier & Glass Tinting	\$ 40.20
Window Film Repair & Maintenance	23.19

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE
 For 'Repair & Maintenance' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (4, 6, 16, 25) on HOLIDAY PAGE

For 'Repair & Maintenance'

Paid: See(5, 6, 16, 25)
 Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES

Wage per hour:
 (1) year terms at the following wage rates:
 7/01/2023

1st term	\$ 21.93
2nd term	30.05
3rd term	39.95
4th term	48.97

Supplemental Benefits:
 (Per hour)

1st term	\$ 18.25
2nd term	25.97
3rd term	31.27
4th term	34.32

8-1087 (DC9 NYC)

Insulator - Heat & Frost **11/01/2023**

JOB DESCRIPTION Insulator - Heat & Frost

DISTRICT 8

ENTIRE COUNTIES
 Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2023	06/01/2024
Insulator	\$ 59.25	+ \$ 2.50
Discomfort & Additional Training**	62.31	+ \$ 2.50
Fire Stop Work*	31.77	+ \$ 2.50

* Applies on all exclusive Fire Stop Work (When contract is for Fire Stop work only). No apprentices on these contracts only.

**Applies to work requiring; garb or equipment worn against the body not customarily worn by insulators; psychological evaluation ;special training, including but not limited to "Yellow Badge" radiation training

Note: Additional \$0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker	\$ 37.35

Discomfort & Additional Training	39.39
Fire Stop Work:	
Journeyworker	19.03

OVERTIME PAY

See (B, E, E2, Q, *T) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Note: Last working day preceding Christmas and New Years day, workers shall work no later than 12:00 noon and shall receive 8 hrs pay.

Overtime: See (2*, 4, 6, 16, 25) on HOLIDAY PAGE.

*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES

(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
\$ 31.77	\$ 37.26	\$ 42.76	\$ 48.26

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
\$ 33.30	\$ 39.09	\$ 44.90	\$ 50.71

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	\$ 19.03
2nd term	22.69
3rd term	26.36
4th term	30.03

Discomfort & Additional Training Apprentices:

1st term	\$ 20.06
2nd term	23.92
3rd term	27.78
4th term	31.66

8-91

Ironworker

11/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour:	07/01/2023	01/01/2024
Stone Derrickmen Rigger	\$ 72.90	Additional + \$ 1.64
Stone Handset Derrickman	70.47	+ \$ 1.11

SUPPLEMENTAL BENEFITS

Per hour:

Stone Derrickmen Rigger	\$ 43.10
Stone Handset Derrickman	42.84

OVERTIME PAY

See (B, D1, *E, Q, **V) on OVERTIME PAGE

*Time and one-half shall be paid for all work on Saturday up to eight (8) hours and double time shall be paid for all work thereafter.

** Benefits same premium as wages on Holidays only

HOLIDAY

Paid: See (18) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 25) on HOLIDAY PAGE

Work stops at schedule lunch break with full day's pay.

REGISTERED APPRENTICES

Wage per hour:

Stone Derrickmen Rigger:

	1st	2nd	3rd	4th
07/01/2023	\$ 35.90	\$ 51.53	\$ 57.32	\$ 63.11

Supplemental Benefits:

Per hour:

07/01/2023	22.11	32.58	32.58	32.58
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Stone Handset:

1/2 year terms at the following hourly wage rate:

	1st	2nd	3rd	4th
07/01/2023	34.56	49.75	55.33	60.90

Supplemental Benefits:

Per hour:

07/01/2023	22.10	32.46	32.46	32.46
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9-197D/R

Ironworker

11/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per Hour: 07/01/2023

Ornamental	\$ 46.90
Chain Link Fence	46.90
Guide Rail	46.90

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker: \$ 63.04

OVERTIME PAY

See (B, B1, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Apprentices Hired after 9/1/18:

1 year terms

	07/01/2023
1st Term	\$ 21.13
2nd Term	24.77
3rd Term	28.40
4th Term	32.06

Supplemental Benefits per hour:

1st Term	\$ 17.90
2nd Term	19.15
3rd Term	20.41
4th Term	21.67

4-580-Or

Ironworker

11/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

PER HOUR:

	07/01/2023	01/01/2024	07/01/2024
Ironworker:		Additional	Additional
Structural Bridges Machinery	\$ 57.20	\$ 1.75/Hr.*	\$ 1.75/Hr.*

(*)To be allocated at a later date.

SUPPLEMENTAL BENEFITS

PER HOUR PAID:

Journeyman \$ 87.35

OVERTIME PAY

See (B, B1, Q, *V) on OVERTIME PAGE

*NOTE: Benefits are calculated for every hour paid

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 18, 19) on HOLIDAY PAGE

REGISTERED APPRENTICES

WAGES PER HOUR:

6 month terms at the following rate:

1st	\$ 29.73
2nd	30.33
3rd - 6th	30.94

Supplemental Benefits

PER HOUR PAID:

All Terms \$ 60.69

4-40/361-Str

Ironworker

11/01/2023

JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES

Rockland: Southern section - south of Convent Road and east of Blue Hills Road.

WAGES

Per hour: 07/01/2023

Reinforcing &
Metal Lathing \$ 56.95

"Base" Wage \$ 55.20
plus \$ 1.75

"Base" Wage is used to calculate overtime hours only.

SUPPLEMENTAL BENEFITS

Per hour:

Reinforcing &
Metal Lathing \$ 42.72

OVERTIME PAY

See (B, E, Q, *X) on OVERTIME PAGE

*Only \$23.50 per Hour for non worked hours

Supplemental Benefit Premiums for Overtime Hours worked:

Time & One Half \$ 49.47
Double Time \$ 56.22

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 13, *18, **19, 25) on HOLIDAY PAGE

*Note: Work performed after first 4 Hours.

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

1st term	2nd term	3rd term	4th Term
Wage Per Hour: \$ 22.55	\$ 28.38	\$ 34.68	\$ 37.18
"Base" Wage \$ 21.00 plus \$1.55	\$ 26.80 plus \$1.58	\$ 33.10 plus \$1.58	\$ 35.60 plus \$1.58

"Base" Wage is used to calculate overtime hours ONLY.

SUPPLEMENTAL BENIFITS

Per Hour:

1st term	2nd term	3rd term	4th Term
\$ 18.17	\$ 21.34	\$ 22.00	\$ 22.50

4-46Reinf

Laborer - Building

11/01/2023

JOB DESCRIPTION Laborer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour	07/01/2023	05/01/2024
Laborer	\$ 40.05 plus \$5.45**	+ \$ 2.00
Laborer - Asbestos & Hazardous Materials Removal	\$ 44.50*	+ \$ 2.00

* Abatement/Removal of:

- Lead based or lead containing paint on materials to be repainted is classified as Painter.
- Asbestos containing roofs and roofing material is classified as Roofer.

** This portion is not subject to overtime premium.

NOTE: Upgrade/Material condition work plan for work performed during non-outage under a wage formula of 90% wage/100% fringe benefits at nuclear power plants.

SUPPLEMENTAL BENEFITS

Per hour: 07/01/2023

Journeyworker \$ 30.50

OVERTIME PAY

See (B, E, E2, Q, *V) on OVERTIME PAGE

*Note: For Sundays and Holidays worked benefits are at the same premium as wages.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

LABORER ONLY

Hourly terms at the following wage:

Level A 0-1000	Level B 1001-2000	Level C 2001-3000	Level D 3001-4000
\$ 28.08	\$ 31.90	\$ 35.72	\$ 39.54

Supplemental Benefits per hour:

Apprentices
 All terms \$ 23.20

Laborer - Heavy&Highway

11/01/2023

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

PUTNAM: APPLIES TO ALL HEAVY & HIGHWAY WORK EXCLUDING HIGHWAYS, STREETS, AND BRIDGES

GROUP I: Blaster, Quarry Master, Curbs/Asphalt Screedman, Pipe Jacking and Boring Operations Operator, Qualified Dead Condition Pipe Fuser (B Mechanic)

GROUP II: Burner, Drillers(jumbo, joy, wagon, air track, hydraulic), Drill Operator, Self Contained Rotary Drill, Curbs, Raker, Bar Person, Concrete Finisher.

GROUP III: Pavement Breakers, Jeeper Operator, Jack Hammer, Pneumatic Tools (all), Gas Driller, Guniting, Railroad Spike Puller, Pipelayer, Chain Saw, Deck winches on scows, Power Buggy Operator, Power Wheelbarrow Operator, Bar Person Helper, Compressed Air lance, Water Jet Lance.

GROUP IV: Concrete Laborers, Asph. Worker, Rock Scaler, Vibrator Oper., Bit Grinder, Air Tamper, Pumps, Epoxy (adhesives, fillers and troweled on), Barco Rammer, Concrete Grinder, Crack Router Operator, Guide Rail-digging holes and placing concrete and demolition when not to be replaced, distribution of materials and tightening of bolts.

GROUP V: Drillers Helpers, Common Laborer, Mason Tenders, Signal Person, Pit Person, Truck Spotter, Powder Person, Landscape/Nursery Person, Dump Person, Temp. Heat.

GROUP VIA: Asbestos/Toxic Waste Laborer-All removal (Roads, Tunnels, Landfills, etc.) Confined space laborer, Bio-remediation, Phyto-remediation, Lead or Hazardous material, Abatement Laborer.

Wages:(per hour) 07/01/2023

GROUP I	\$ 49.55*
GROUP II	48.20*
GROUP III	47.80*
GROUP IV	47.45*
GROUP V	47.10*
GROUP VIA	49.10*
Operator Qualified	
Gas Mechanic(A Mech)	59.55*
Flagperson	40.75*

*NOTE: To calculate overtime premiums, deduct \$0.10 from above wages

SHIFT WORK: A shift premium will be paid on Public Work contracts for off-shift or irregular shift work when mandated by the NYS D.O.T. or other Governmental Agency contracts. Employees shall receive an additional 15% per hour above current rate for all regular and irregular shift work. Premium pay shall be calculated using the 15% per hour differential as base rate.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

First 40 Hours	
Per Hour	\$ 26.60
Over 40 Hours	
Per Hour	19.85

OVERTIME PAY

See (B, E, P, R, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

NOTE: For Holiday Overtime: 5, 6 - Code 'S' applies
 For Holiday Overtime: 8, 15, 25, 26 - Code 'R' applies

REGISTERED APPRENTICES

	1st term	2nd term	3rd term	4th term
	1-1000hrs	1001-2000hrs	2001-3000hrs	3001-4000hrs
07/01/2023	\$ 27.46	\$ 32.41	\$ 37.12	\$ 41.83

Supplemental Benefits per hour:

1st term	\$ 3.85 - After 40 hours: \$ 3.60
2nd term	\$ 3.95 - After 40 hours: 3.60
3rd term	\$ 4.45 - After 40 hours: 4.00
4th term	\$ 5.00 - After 40 hours: 4.50

8-60H/H

Laborer - Tunnel

11/01/2023

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 11

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Otsego, Putnam, Rockland, Sullivan, Ulster, Westchester

PARTIAL COUNTIES

Chenango: Townships of Columbus, Sherburne and New Berlin.

Delaware: Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Merideth and Davenport.

WAGES

Class 1: All support laborers/sandhogs working above the shaft or tunnel.

Class 2: All laborers/sandhogs working in the shaft or tunnel.

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2023	06/01/2024	06/01/2025
Class 1	\$ 55.55	\$ 57.05	\$ 58.55
Class 2	57.70	59.20	60.70
Class 4	64.10	65.60	67.10
Class 5	47.65	49.90	51.40

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional \$ 3.00 an hour.

SHIFT DIFFERENTIAL...On all Government mandated irregular shift work:

- Employee shall be paid at time and one half the regular rate Monday through Friday.
- Saturday shall be paid at 1.65 times the regular rate.
- Sunday shall be paid at 2.15 times the regular rate.

SUPPLEMENTAL BENEFITS

Per hour:

Benefit 1	\$ 35.73	\$ 36.98	\$ 38.23
Benefit 2	51.01	TBD	TBD
Benefit 3	71.28	TBD	TBD

Benefit 1 applies to straight time hours, paid holidays not worked.

Benefit 2 applies to over 8 hours in a day (M-F), irregular shift work hours worked, and Saturday hours worked.

Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY

See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 15, 16, 25) on HOLIDAY PAGE

When a recognized Holidays falls on Saturday or Sunday, holidays falling on Saturday shall be recognized or observed on Friday and holidays falling on Sunday shall be recognized or observed on Monday. Employees ordered to work on the Saturday or Sunday of the holiday or on the recognized or the observed Friday or Monday for those holidays falling on Saturday or Sunday shall receive double time the established rate and benefits for the holiday.

REGISTERED APPRENTICES

FOR APPRENTICE RATES, refer to the appropriate Laborer Heavy & Highway wage rate contained in the wage schedule for the County and location where the work is to be performed.

11-17/60/235/754Tun

Lineman Electrician

11/01/2023

JOB DESCRIPTION Lineman Electrician

DISTRICT 6

ENTIRE COUNTIES

Westchester

WAGES

A Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors, assembly of all electrical materials, conduit, pipe or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment/operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

Below rates apply to electrical overhead and underground distribution and maintenance work and overhead and underground transmission line work, electrical substations, switching structures, continuous pipe-type underground fluid or gas filled transmission conduit and cable installations, maintenance jobs or projects, railroad catenary installations and maintenance, third rail installations, the bonding of rails and the installation of fiber optic cable. (Ref #14.04.01)

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines. Also includes digging of holes for poles, anchors, footer, and foundations for electrical equipment.

Per hour:	07/01/2023	05/06/2024
Lineman, Tech, Welder	\$ 60.41	\$ 61.91
Crane, Crawler Backhoe	60.41	61.91
Cable Splicer-Pipe Type	66.45	68.10
Digging Mach Operator	54.37	55.72
Cert. Welder-Pipe Type	63.43	65.01
Tractor Trailer Driver	51.35	52.62
Groundman, Truck Driver	48.33	49.53
Equipment Mechanic	48.33	49.53
Flagman	36.25	37.15

Additional \$1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2023	05/06/2024
Lineman, Technician, or Equipment Operators with Crane License	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid
All other Journeyman	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept of Jurisdiction.
 NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
 Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
 Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2023	05/06/2024
\$ 26.40	\$ 26.90
*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWest

Lineman Electrician - Teledata

11/01/2023

JOB DESCRIPTION Lineman Electrician - Teledata

DISTRICT 6

ENTIRE COUNTIES

Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

	07/01/2023	01/01/2024	01/01/2025
Cable Splicer	\$ 37.73	\$ 39.24	\$ 40.81
Installer, Repairman	\$ 35.81	\$ 37.24	\$ 38.73
Teledata Lineman	\$ 35.81	\$ 37.24	\$ 38.73
Tech., Equip. Operator	\$ 35.81	\$ 37.24	\$ 38.73
Groundman	\$ 18.98	\$ 19.74	\$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2023	01/01/2024	01/01/2025
Journeyman	\$ 5.70	\$ 5.70	\$ 5.70
	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting **11/01/2023**

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT 6**

ENTIRE COUNTIES

Westchester

WAGES

Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
 (Ref #14.01.03)

Per hour:	07/01/2023	05/06/2024
Lineman, Technician	\$ 54.73	\$ 55.95
Crane, Crawler Backhoe	54.73	55.95
Certified Welder	57.47	58.75
Digging Machine	49.26	50.36
Tractor Trailer Driver	46.52	47.56
Groundman, Truck Driver	43.78	44.76
Equipment Mechanic	43.78	44.76
Flagman	32.84	33.57

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2023	05/06/2024
Lineman, Technician,	\$ 29.40	\$ 30.90

or Equipment Operators with Crane License	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid
All other Journeyman	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept. of Jurisdiction.
 NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
 Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.
 Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

	07/01/2023	05/06/2024
	\$ 26.40	\$ 26.90
	*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWestLT

Mason - Building

11/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	12/04/2023	06/05/2024
Tile Setters	\$ 62.98	Additional \$ 0.72	Additional \$ 0.72

SUPPLEMENTAL BENEFITS

Per Hour:
 \$ 25.61*
 + \$10.04

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE
 Work beyond 10 hours on Saturday shall be paid at double the hourly wage rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:

(750 hour) term at the following wage rate:

Term:	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
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1-750	751-1500	1501-2250	2251-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6501-7000
07/01/2023 \$21.70	\$26.66	\$33.75	\$38.69	\$42.25	\$45.70	\$49.29	\$54.23	\$57.09	\$61.25

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2023 \$12.55* +\$0.73	\$12.55* +\$0.78	\$15.36* +\$0.88	\$15.36* +\$0.88	\$16.36* +\$1.37	\$17.86* +\$1.42	\$18.86* +\$1.83	\$18.86* +\$1.88	\$16.86* +\$6.03	\$22.11* +\$6.61

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52A

Mason - Building **11/01/2023**

JOB DESCRIPTION Mason - Building

DISTRICT 11

ENTIRE COUNTIES
 Putnam, Rockland, Westchester

PARTIAL COUNTIES
 Orange: Only the Township of Tuxedo.

WAGES
 Per hour:

07/01/2023

Bricklayer	\$ 45.89
Cement Mason	45.89
Plasterer/Stone Mason	45.89
Pointer/Caulker	45.89

Additional \$1.00 per hour for power saw work
 Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:

- Irregular workday requires 15% premium
- Second shift an additional 15% of wage plus benefits to be paid
- Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS
 Per hour:

Journeyman	\$ 37.95
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OVERTIME PAY

OVERTIME:
 Cement Mason See (B, E, Q, W) on OVERTIME PAGE.
 All Others See (B, E, Q) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5wp-b

Mason - Building

11/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Building

	07/01/2023	01/01/2024
Wages per hour:		Additional
Mosaic & Terrazzo Mechanic	\$ 60.65	\$1.06
Mosaic & Terrazzo Finisher	59.04	

SUPPLEMENTAL BENEFITS

Per hour:

Mosaic & Terrazzo Mechanic	\$ 30.26* + \$9.16
Mosaic & Terrazzo Finisher	\$ 30.26* + \$9.15

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (A, E, Q) on OVERTIME PAGE

07/01/2023- Deduct \$7.25 from hourly wages before calculating overtime.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

Easter Sunday is an observed holiday. Holidays falling on a Saturday will be observed on that Saturday. Holidays falling on a Sunday will be celebrated on the Monday.

REGISTERED APPRENTICES

Wages Per hour:

1st	2nd	3rd	4th	5th	6th
0- 1500	1501- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000
\$ 25.82	\$ 33.19	\$ 36.39	\$ 40.38	\$ 48.52	\$ 54.59

Supplemental Benefits per hour:

\$6.00*	\$7.72*	\$18.16*	\$23.27*	\$24.21*	\$27.24*
+\$3.21	+\$4.12	+\$5.50	+\$6.41	+\$7.33	+\$8.29

*This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/3

Mason - Building

11/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	07/03/2023
Building-Marble Restoration:		
Marble, Stone &	\$ 47.22	\$ 47.44

Terrazzo Polisher

SUPPLEMENTAL BENEFITS

Per Hour:
 Journeyworker:

Building-Marble Restoration:

Marble, Stone &
 Polisher \$ 30.29 \$ 30.64

OVERTIME PAY

See (B, *E, Q, V) on OVERTIME PAGE
 *ON SATURDAYS, 8TH HOUR AND SUCCESSIVE HOURS PAID AT DOUBLE HOURLY RATE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE
 1ST TERM APPRENTICE GETS PAID FOR ALL OBSERVED HOLIDAYS.

REGISTERED APPRENTICES

WAGES per hour:

900 hour term at the following wage:

1st 1- 900	2nd 901- 1800	3rd 1801- 2700	4th 2701
\$ 33.04	\$ 37.78	\$ 42.49	\$ 47.22

Supplemental Benefits Per Hour:

27.65	28.52	29.41	30.29
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07/03/2023

900 hour term at the following wage:

1st 1- 900	2nd 901- 1800	3rd 1801- 2700	4th 2701
\$ 33.19	\$ 37.95	\$ 42.69	\$ 47.44

Supplemental Benefits Per Hour:

27.99	28.86	29.76	30.64
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9-7/24-MP

Mason - Building

11/01/2023

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester

WAGES

Per Hour:

07/01/2023 7/03/2023

Marble Cutters & Setters \$ 62.82 \$ 63.12

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 39.03 \$ 39.34

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage Per Hour:

07/01/2023

750 hour terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th
0-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6751-7500	7500+
\$ 26.42	\$ 39.62	\$ 42.91	\$ 46.22	\$ 49.52	\$ 53.38	\$ 59.67	\$ 62.82

Supplemental Benefits per hour:
 07/01/2023

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 25.38	\$ 28.86	\$ 29.74	\$ 30.60	\$ 31.48	\$ 36.44	\$ 38.17	\$ 39.03

07/03/2023
 Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
0-3000	3001-3750	3751-4500	4501-5250	5251-6000	6001-6750	6751-7500	7500+
\$ 26.60	\$ 39.82	\$ 43.13	\$ 46.45	\$ 49.78	\$ 53.64	\$ 59.95	\$ 63.12

Supplemental Benefits Per Hour:

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 25.54	\$ 29.09	\$ 29.97	\$ 30.84	\$ 31.72	\$ 36.73	\$ 38.48	\$ 39.34

9-7/4

Mason - Building **11/01/2023**

JOB DESCRIPTION Mason - Building **DISTRICT 9**

ENTIRE COUNTIES
 Nassau, Rockland, Suffolk, Westchester

WAGES
 Per hour: 07/01/2023 12/04/2023 06/03/2024

Tile Finisher \$ 48.36 Additional \$ 0.59 Additional \$ 0.59

SUPPLEMENTAL BENEFITS
 Per Hour: \$ 22.56*
 + \$9.86

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY
 See (B, E, Q, *V) on OVERTIME PAGE

*Work beyond 10 hours on a Saturday shall be paid at double the hourly wage rate.

HOLIDAY
 Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 11, 15, 16, 25) on HOLIDAY PAGE

9-7/88A-tf

Mason - Building **11/01/2023**

JOB DESCRIPTION Mason - Building **DISTRICT 9**

ENTIRE COUNTIES
 Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES
 Per hour: 07/01/2023 07/03/2023

Marble, Stone, Maintenance Finishers: \$ 27.26 \$ 27.44

Note 1: An additional \$2.00 per hour for time spent grinding floor using "60 grit" and below.

Note 2: Flaming equipment operator shall be paid an additional \$25.00 per day.

SUPPLEMENTAL BENEFITS

Per Hour:

Marble, Stone Maintenance Finishers:	\$ 14.97	\$ 15.20
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OVERTIME PAY

See (B, *E, Q, V) on OVERTIME PAGE

*Double hourly rate after 8 hours on Saturday

HOLIDAY

Paid: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 11, 15, 25) on HOLIDAY PAGE

1st term apprentice gets paid for all observed holidays.

REGISTERED APPRENTICES

WAGES per hour:

	07/01/2023	07/03/2023
0-750	\$ 21.89	\$ 22.04
751-1500	22.60	\$ 22.75
1501-2250	23.32	\$ 23.48
2251-3000	24.04	\$ 24.20
3001-3750	25.11	\$ 25.27
3751-4500	26.54	\$ 26.72
4501+	27.26	\$ 27.44

Supplemental Benefits:

Per hour:

0-750	12.03	\$ 12.24
751-1500	12.43	\$ 12.64
1501-2250	12.82	\$ 13.03
2251-3000	13.21	\$ 13.42
3001-3750	13.80	\$ 14.02
3751-4500	14.58	\$ 14.80
4501+	14.97	\$ 15.20

9-7/24M-MF

Mason - Building / Heavy&Highway

11/01/2023

JOB DESCRIPTION Mason - Building / Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour:	07/01/2023	07/03/2023	01/01/2024 Additional \$ 0.53
Marble-Finisher	\$ 49.32	\$ 49.65	

SUPPLEMENTAL BENEFITS

Journeyworker:

Per hour

Marble- Finisher	\$ 36.62	\$ 36.67
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OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

Work beyond 8 hours on a Saturday shall be paid at double the rate.

HOLIDAY

Overtime: See (5, 6, 8, 11, 15, 16, 25) on HOLIDAY PAGE

When an observed holiday falls on a Sunday, it will be observed the next day.

9-7/20-MF

Mason - Heavy&Highway

11/01/2023

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour:

07/01/2023

Bricklayer	\$ 46.39
Cement Mason	46.39
Marble/Stone Mason	46.39
Plasterer	46.39
Pointer/Caulker	46.39

Additional \$1.00 per hour for power saw work
Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular workday is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

- Irregular workday requires 15% premium
- Second shift an additional 15% of wage plus benefits to be paid
- Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 37.95
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OVERTIME PAY

Cement Mason	See (B, E, Q, W)
All Others	See (B, E, Q,)

HOLIDAY

Paid:	See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime:	See (5, 6, 16, 25) on HOLIDAY PAGE

- Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.
- Supplemental Benefits are not paid for paid Holiday
- If Holiday is worked, Supplemental Benefits are paid for hours worked.
- Whenever an Employee works within three (3) calendar days before a holiday, the Employee shall be paid for the Holiday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5WP-H/H

Operating Engineer - Building

11/01/2023

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

PARTIAL COUNTIES

Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES

NOTE: Construction surveying

Party Chief--One who directs a survey party

Instrument Man--One who runs the instrument and assists Party Chief.
 Rodman--One who holds the rod and assists the Survey Crew

Wages:(Per Hour) 07/01/2023

Building Construction:

Party Chief	\$ 77.39
Instrument Man	61.25
Rodman	41.39

Steel Erection:

Party Chief	80.16
Instrument Man	63.60
Rodman	44.23

**Heavy Construction-NYC counties only:
 (Foundation, Excavation.)**

Party Chief	85.74
Instrument man	64.40
Rodman	54.90

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

Building Construction	\$ 28.04* +\$ 7.65
Steel Erection	28.64* +\$ 7.65
Heavy Construction	28.85* +\$ 7.64

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:

21.19

OVERTIME PAY

See (A, B, E, Q) on OVERTIME PAGE

Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.

Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY

Paid: See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 9, 11, 15, 16, 25) on HOLIDAY PAGE

9-15Db

Operating Engineer - Building

11/01/2023

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I:

Cranes (All Types up to 49 tons), Boom Trucks, Cherry Pickers (All Types), Clamshell Crane, Derrick (Stone and Steel), Dragline, Franki Pile Rig or similar, High Lift (Lull or similar) with crane attachment and winch used for hoisting or lifting, Hydraulic Cranes, Pile Drivers, Potain and similar.

Cranes (All types 50-99 tons), Drill Rig Casa Grande (CAT or similar), Franki Pile Rig or similar, Hydraulic Cranes (All types including Crawler Cranes- No specific boom length).

Cranes (All types 100 tons and over), All Tower Cranes, All Climbing Cranes irrespective of manufacturer and regardless of how the same is rigged, Franki Pile Rig or similar, Conventional Cranes (All types including Crawler Cranes-No specific boom length), Hydraulic Cranes.

GROUP I-A: Barber Green Loader-Euclid Loader, Bulldozer, Carrier-Trailer Horse, Concrete Cleaning Decontamination Machine Operator, Concrete-Portable Hoist, Conway or Similar Mucking Machines, Elevator & Cage, Excavators all types, Front End Loaders, Gradall, Shovel, Backhoe, etc.(Crawler or Truck), Heavy Equipment Robotics Operator/Mechanic, Hoist Engineer-Material, Hoist Portable Mobile Unit, Hoist(Single, Double or Triple Drum), Horizontal Directional Drill Locator, Horizontal Directional Drill Operator and Jersey Spreader, Letourneau or Tournapull(Scrapers over 20 yards Struck), Lift Slab Console, etc., Lull HiLift or Similar, Master Environmental Maintenance Mechanics, Mucking Machines Operator/Mechanic or Similar Type, Overhead Crane, Pavement Breaker(Air Ram), Paver(Concrete), Post Hole Digger, Power House Plant, Road Boring Machine, Road Mix Machine, Ross Carrier and Similar Machines, Rubber tire double end backhoes and similar machines, Scoopmobile Tractor-Shovel Over 1.5 yards, Shovel (Tunnels), Spreader (Asphalt) Telephie(Cableway), Tractor Type Demolition Equipment, Trenching Machines-Vermeer Concrete Saw Trencher and Similar, Ultra High Pressure Waterjet Cutting Tool System, Vacuum Blasting Machine operator/mechanic, Winch Truck A Frame.

GROUP I-B: Compressor (Steel Erection), Mechanic (Outside All Types), Negative Air Machine (Asbestos Removal), Push Button (Buzz Box) Elevator.

GROUP II: Compactor Self-Propelled, Concrete Pump, Crane Operator in Training (Over 100 Tons), Grader, Machines Pulling Sheep's Foot Roller, Roller (4 ton and over), Scrapers (20 yards Struck and Under), Vibratory Rollers, Welder.

GROUP III-A: Asphalt Plant, Concrete Mixing Plants, Forklift (All power sources), Joy Drill or similar, Tractor Drilling Machine, Loader (1 1/2 yards and under), Portable Asphalt Plant, Portable Batch Plant, Portable Crusher, Skid Steer (Bobcat or similar), Stone Crusher, Well Drilling Machine, Well Point System.

GROUP III-B: Compressor Over 125 cu. Feet, Conveyor Belt Machine regardless of size, Compressor Plant, Ladder Hoist, Stud Machine.

GROUP IV-A: Batch Plant, Concrete Breaker, Concrete Spreader, Curb Cutter Machine, Finishing Machine-Concrete, Fine Grading Machine, Hepa Vac Clean Air Machine, Material Hopper(sand, stone, cement), Mulching Grass Spreader, Pump Gypsum etc, Pump-Plaster-Grout-Fireproofing. Roller(Under 4 Ton),Spreading and Fine Grading Machine, Steel Cutting Machine, Siphon Pump, Tar Joint Machine, Television Cameras for Water, Sewer, Gas etc. Turbo Jet Burner or Similar Equipment, Vibrator (1 to 5).

GROUP IV-B: Compressor (all types), Heater (All Types), Fire Watchman, Lighting Unit (Portable & Generator) Pump, Pump Station(Water, Sewer, Portable, Temporary), Welding Machine (Steel Erection & Excavation).

GROUP V: Mechanics Helper, Motorized Roller (walk behind), Stock Attendant, Welder's Helper, Maintenance Engineer Crane(75 ton and over).

Group VI-A: Welder Certified

GROUP VI-B: Utility Man, Warehouse Man.

WAGES: (per hour)

	07/01/2023	03/04/2024
GROUP I		
Cranes- up to 49 tons	\$ 66.23	\$ 67.43
Cranes- 50 tons to 99 tons	68.53	69.77
Cranes- 100 tons and over	78.21	79.64
GROUP I-A	58.01	59.04
GROUP I-B	53.48	54.41
GROUP II	55.98	56.97
GROUP III-A	53.94	54.88
GROUP III-B	51.35	52.25
GROUP IV-A	53.40	54.33
GROUP IV-B	45.17	45.94
GROUP V	48.69	49.53
Group VI-A	56.96	57.96
GROUP VI-B		
Utility Man	46.21	47.00
Warehouse Man	48.52	49.26

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects.

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour.

Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour.

Loader operators over 5 cubic yard capacity additional .50 per hour.

Shovel operators over 4 cubic yard capacity additional \$1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 31.57 \$ 32.32

OVERTIME PAY

See (B, E, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

8-137B

Operating Engineer - Heavy&Highway

11/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane, (Crawler, Truck), Dragline, Drill Rig (Casa Grande, Cat, or Similar), Floating Crane (Crane on Barges) under 100 tons, Gin Pole, Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger (Truck or Truck Mounted), Boat Captain, Bulldozer-All Sizes, Central Mix Plant Operator, Chipper (all types), Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader (Motor Grader), Elevator & Cage (Materials or Passenger), Excavator (and all attachments), Front End Loaders (1 1/2 yards and over), High Lift Lull and similar, Hoist (Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer (Material), Jack and Bore Machine, Log Skidders, Mill Machines, Mucking Machines, Overhead Crane, Paver (concrete), Post Pounder (of any type), Push Cats, Road Reclaimer, Robot Hammer (Brokk or similar), Robotic Equipment (Scope of Engineer Schedule), Ross Carrier and similar, Scrapers (20 yard struck and over), Side Boom, Slip Form Machine, Spreader (Asphalt), Trenching Machines (Telephies-Vermeer Concrete Saw), Tractor Type Demolition Equipment, Vacuum Truck. Vibratory Roller(Riding) or Roller used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver (Asphalt).

GROUP II-A: Ballast Regulators, Compactor Self Propelled, Fusion Machine, Rail Anchor Machines, Roller (4 ton and over), Scrapers (20 yard struck and under).

GROUP II-B: Mechanic (Outside) All Types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler (High Pressure), Concrete Breaker (Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift (all types), Gas Tapping (Live), Hydroseeder, Loader (1 1/2 yards and under), Locomotive (all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher (Apprentice), Powerhouse Plant, Roller (under 4 ton), Sheer Excavator, Skid Steer/Bobcat, Stone Crusher, Sweeper (with seat), Well Drilling Machine.

GROUP IV: Service Person (Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine (Truck Mounted), Heater (all types), Lighting Unit (Portable), Maintenance Engineer (For Crane Only), Mechanics Helper, Pump (Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck (Sewer Jet or Similar), Welders Helper, Welding Machine (Steel Erection), Well Point System.

GROUP V: All Tower Cranes-All Climbing Cranes and all cranes of 100-ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged, Hoist Engineer (Steel), Engineer-Pile Driver, Jersey Spreader, Pavement Breaker/Post Hole Digger.

WAGES: Per hour:	07/01/2023	03/04/2024
Group I	\$ 67.27	\$ 68.63
Group I-A	59.26	60.42
Group I-B	62.46	63.70
Group II-A	56.74	57.84
Group II-B	58.52	59.67
Group III	55.74	56.81
Group IV	50.63	51.57
Group IV-B	43.43	44.19
Group V Engineer All Tower, Climbing and		

Cranes of 100 Tons	76.24	77.82
Hoist Engineer(Steel)	69.01	70.41
Engineer(Pile Driver)	73.61	75.13
Jersey Spreader, Pavement Breaker (Air Ram)Post Hole Digger	58.06	59.19

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour over the rate listed in the Wage Schedule. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour over the rate listed in the Wage Schedule. Loader and Excavator Operators: over 5 cubic yards capacity \$0.50 per hour over the rate listed in the Wage Schedule. Shovel Operators: over 4 cubic yards capacity \$1.00 per hour over the rate listed in the Wage Schedule.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:	\$ 33.75 up to 40 Hours	\$ 34.85 up to 40 hours
	After 40 hours \$ 24.50* PLUS \$ 1.25 on all hours worked	After 40 hours \$ 25.55* PLUS \$ 1.25 on all hours worked

*This amount is subject to premium

OVERTIME PAY

See (B, E, P, *R, **U) on OVERTIME PAGE

HOLIDAY

Paid:..... See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime..... See (5, 6, 8, 15, 25, 26) on OVERTIME PAGE

* For Holiday codes 8,15,25,26 code R applies

** For Holiday Codes 5 & 6 code U applies

Note: If employees are required to work on Easter Sunday they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rate.

1st term	\$ 29.63	\$ 30.21
2nd term	35.56	36.25
3rd term	41.48	42.30
4th term	47.41	48.34
Supplemental Benefits per hour:		
	25.70	26.85

8-137HH

Operating Engineer - Heavy&Highway

11/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: South of the North city line of Poughkeepsie

WAGES

Party Chief - One who directs a survey party

Instrument Man - One who runs the instrument and assists Party Chief

Rodman - One who holds the rod and in general, assists the Survey Crew
Categories cover GPS & Underground Surveying

Per Hour: 07/01/2023

Party Chief \$ 81.72
Instrument Man 61.43
Rodman 52.40

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

All Categories
Straight Time: \$ 25.25* + \$7.64

Premium:
Time & 1/2 \$ 37.88* + \$7.64

Double Time \$ 50.50* + \$7.64

Non-Worked Holiday Supplemental Benefits:
\$ 21.19

OVERTIME PAY

See (B, *E, Q) on OVERTIME PAGE

* Doubletime paid on all hours in excess of 8 hours on Saturday

HOLIDAY

Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

9-15Dh

Operating Engineer - Heavy&Highway - Tunnel

11/01/2023

JOB DESCRIPTION Operating Engineer - Heavy&Highway - Tunnel

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane(Crawler, Truck), Dragline, Drill Rig Casa Grande(Cat or Similar), Floating Crane(Crane on Barge-Under 100 Tons), Hoist Engineer(Concrete/Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger(Truck or Truck Mounted), Boat Captain, Bull Dozer-all sizes, Central Mix Plant Operator, Chipper-all types, Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader(Motor Grader), Elevator & Cage(Materials or Passengers), Excavator(and all attachments), Front End Loaders(1 1/2 yards and over), High Lift Lull, Hoist(Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer(Material), Jack and Bore Machine, Log Skidder, Milling Machine, Moveable Concrete Barrier Transfer & Transport Vehicle, Mucking Machines. Overhead Crane, Paver(Concrete), Post Pounder of any type, Push Cats, Road Reclaimer, Robot Hammer(Brokk or similar), Robotic Equipment(Scope of Engineer Schedule), Ross Carrier and similar machines, Scrapers(20 yards struck and over), Side Boom, Slip Form Machine, Spreader(Asphalt), Trenching Machines, Telephies-Vermeer Concrete Saw, Tractor type demolition equipment, Vacuum Truck, Vibratory Roller (Riding) used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver(Asphalt).

GROUP II-A: Ballast Regulators, Compactor(Self-propelled), Fusion Machine, Rail Anchor Machines, Roller(4 ton and over), Scrapers(20 yard struck and under).

GROUP II-B: Mechanic(outside)all types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler(High Pressure), Concrete Breaker(Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift(all types of power), Gas Tapping(Live), Hydroseeder, Loader(1 1/2 yards and under), Locomotive(all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher(Apprentice), Powerhouse Plant, Roller(under 4 ton), Sheer Excavator, Skidsteer/Bobcat, Stone Crusher, Sweeper(with seat), Well Drilling Machine.

GROUP IV-A: Service Person(Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine(Truck Mounted), Heater(all types), Lighting Unit(Portable), Maintenance Engineer(for Crane only), Mechanics Helper, Pump(Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck(Sewer Jet or similar), Welding Machine(Steel Erection), Welders Helper.

GROUP V-A: Engineer(all Tower Cranes, all Climbing Cranes & all Cranes of 100 ton capacity or greater),Hoist Engineer(Steel-Sub Structure), Engineer-Pile Driver, Jersey-Spreader, Pavement breaker, Post Hole Digger

WAGES: (per hour)

	07/01/2023	03/04/2024
GROUP I	\$ 67.27	\$ 68.63
GROUP I-A	59.26	60.42
GROUP I-B	62.46	63.70
GROUP II-A	56.74	57.84
GROUP II-B	58.52	59.67
GROUP III	55.74	56.81
GROUP IV-A	50.63	51.57
GROUP IV-B	43.43	44.19
GROUP V-A		
Engineer-Cranes	76.24	77.82
Engineer-Pile Driver	73.61	75.13
Hoist Engineer	69.01	70.41
Jersey Spreader/Post Hole Digger	58.06	59.19

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects. Operators required to use two buckets pouring concrete on other than road pavement shall receive \$0.50 per hour over scale. Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour. Operators of shovels with a capacity over (4) cubic yards shall be paid an additional \$1.00 per hour. Operators of loaders with a capacity over (5) cubic yards shall be paid an additional \$0.50 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

\$ 33.75 up to	\$ 34.85 up to
40 hours	40 hours
After 40 hours	After 40 hours
\$24.50 plus	\$25.55 plus
\$1.25 on all	\$1.25 on all
hours worked	hours worked

OVERTIME PAY

See (D, O, *U, V) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

* Note: For Holiday codes 5 & 6, code U applies. For Holiday codes 8, 15, 25, 26, code R applies.

Note: If employees are required to work on Easter Sunday, they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rates:

1st term	\$ 29.63	\$ 30.21
2nd term	35.56	36.25
3rd term	41.48	42.30
4th term	47.41	48.34

Supplemental Benefits per hour:

All terms	\$ 25.70	\$ 26.85
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8-137Tun

JOB DESCRIPTION Operating Engineer - Marine Dredging

DISTRICT 4

ENTIRE COUNTIES

Albany, Bronx, Cayuga, Clinton, Columbia, Dutchess, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Orange, Oswego, Putnam, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Suffolk, Ulster, Washington, Wayne, Westchester

WAGES

These wages do not apply to Operating Engineers on land based construction projects. For those projects, please see the Operating Engineer Heavy/Highway Rates. The wage rates below for all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2023	10/01/2023
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more.	\$ 43.94	\$ 45.26
CLASS A2 Crane Operator (360 swing)	39.16	40.33
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer Licensed Boat, Crew Boat Operator	38.00	39.14
CLASS B2 Certified Welder	35.77	36.84
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	34.79	35.83
CLASS C2 Boat Operator	33.67	34.68
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	27.97	28.81

SUPPLEMENTAL BENEFITS

Per Hour:

THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	\$ 11.85 plus 6% of straight time wage, Overtime hours add \$ 0.63	\$ 12.00 plus 6% of straight time wage, Overtime hours add \$ 0.63
All Class C	\$ 11.60 plus 6% of straight time wage, Overtime hours add \$ 0.50	\$ 11.75 plus 6% of straight time wage, Overtime hours add \$ 0.50
All Class D	\$ 11.35 plus 6% of straight time	\$ 11.60 plus 6% of straight time

wage, Overtime hours
 add \$ 0.38

wage, Overtime hours
 add \$ 0.50

OVERTIME PAY

See (B2, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 15, 26) on HOLIDAY PAGE

4-25a-MarDredge

Operating Engineer - Survey Crew - Consulting Engineer

11/01/2023

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

PARTIAL COUNTIES

Dutchess: That part in Dutchess County lying South of the North City line of Poughkeepsie.

WAGES

Feasibility and preliminary design surveying, any line and grade surveying for inspection or supervision of construction.

Per hour: 07/01/2023
 Survey Classifications

Party Chief \$ 47.15
 Instrument Man 39.30
 Rodman 34.35

SUPPLEMENTAL BENEFITS

Per Hour:

All Crew Members: \$ 23.15

OVERTIME PAY

OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.
 *Double-time paid on the 9th hour on Saturday.

HOLIDAY

Paid: See (5, 6, 7, 11, 16) on HOLIDAY PAGE
 Overtime: See (5, 6, 7, 11, 16) on HOLIDAY PAGE

9-15dconsult

Painter

11/01/2023

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Suffolk, Westchester

WAGES

Per hour: 07/01/2023

Brush \$ 51.70*

Abatement/Removal of lead based
 or lead containing paint on
 materials to be repainted. 51.70*

Spray & Scaffold \$ 54.70*
 Fire Escape 54.70*
 Decorator 54.70*
 Paperhanger/Wall Coverer 54.48*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:

Paperhanger \$ 34.60
 All others 32.73
 Premium 36.70**

**Applies only to "All others" category, not paperhanger journeyworker.

OVERTIME PAY

See (A, H) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

One (1) year terms at the following wage rate.

Per hour:	07/01/2023
Appr 1st term...	\$ 19.95*
Appr 2nd term...	25.56*
Appr 3rd term...	31.05*
Appr 4th term...	41.62*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental benefits:

Per Hour:	
Appr 1st term...	\$ 16.06
Appr 2nd term...	19.95
Appr 3rd term...	23.02
Appr 4th term...	29.16

8-NYDC9-B/S

Painter

11/01/2023

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

Putnam, Suffolk, Westchester

PARTIAL COUNTIES

Nassau: All of Nassau except the areas described below: Atlantic Beach, Ceaderhurst, East Rockaway, Gibson, Hewlett, Hewlett Bay, Hewlett Neck, Hewlett Park, Inwood, Lawrence, Lido Beach, Long Beach, parts of Lynbrook, parts of Oceanside, parts of Valley Stream, and Woodmere. Starting on the South side of Sunrise Hwy in Valley Stream running east to Windsor and Rockaway Ave., Rockville Centre is the boundary line up to Lawson Blvd. turn right going west all the above territory. Starting at Union Turnpike and Lakeville Rd. going north to Northern Blvd. the west side of Lakeville road to Northern blvd. At Northern blvd. going east the district north of Northern blvd. to Port Washington Blvd. West of Port Washington blvd.to St.Francis Hospital then north of first traffic light to Port Washington and Sands Point, Manor HAVen, Harbour Acres.

WAGES

Per hour:	07/01/2023
Drywall Taper	\$ 51.45*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	\$ 30.88

OVERTIME PAY

See (A, H) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages - Per Hour:

1500 hour terms at the following wage rate:

1st term	\$ 19.95*
2nd term	25.56*
3rd term	31.00*
4th term	41.52*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental Benefits - Per hour:

One year term (1500 hours) at the following dollar amount.

1st year	\$ 15.22
2nd year	18.90
3rd year	21.81
4th year	27.58

8-NYDCT9-DWT

Painter - Bridge & Structural Steel

11/01/2023

JOB DESCRIPTION Painter - Bridge & Structural Steel

DISTRICT 8

ENTIRE COUNTIES

Albany, Bronx, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Kings, Montgomery, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per Hour:

STEEL:

Bridge Painting:	07/01/2023	10/01/2023
	\$ 54.50	\$ 56.00
	+ 10.10*	+ 10.35*

ADDITIONAL \$6.50 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

NOTE: All premium wages are to be calculated on base rate per hour only.

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

NOTE: Generally, for Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:	\$ 11.78	\$ 12.43
	+ 30.85*	+ 31.55*

* For the period of May 1st to November 15th, this amount is payable up to 40 hours. For the period of Nov 16th to April 30th, this amount is payable up to 50 hours. EXCEPTION: First and last week of employment, and for the weeks of Memorial Day, Independence Day and Labor Day, where the amount is paid for the actual number of hours worked (no cap).

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
 Overtime: See (4, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage - Per hour:

Apprentices: (1) year terms.

1st year	\$ 21.80	\$ 22.40
	+ 4.04	+ 4.14
2nd year	\$ 32.70	\$ 33.60
	+ 6.06	+ 6.21
3rd year	\$ 43.60	\$ 44.80
	+ 8.08	+ 8.28

Supplemental Benefits - Per hour:

1st year	\$.90 + 12.34	\$ 1.16 + 12.62
2nd year	\$ 7.07 + 18.51	\$ 7.46 + 18.93
3rd year	\$ 9.42 + 24.68	\$ 9.94 + 25.24

NOTE: All premium wages are to be calculated on base rate per hour only.

8-DC-9/806/155-BrSS

Painter - Line Striping **11/01/2023**

JOB DESCRIPTION Painter - Line Striping

DISTRICT 8

ENTIRE COUNTIES

Albany, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Nassau, Orange, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per hour:

Painter (Striping-Highway):	07/01/2023	01/01/2024	07/01/2024
Striping-Machine Operator*	\$ 31.53	\$ 31.53	\$ 34.12
Linerman Thermoplastic	38.34	38.34	41.12

Note: * Includes but is not limited to: Positioning of cones and directing of traffic using hand held devices. Excludes the Driver/Operator of equipment used in the maintenance and protection of traffic safety.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyworker:

Striping Machine Operator:	\$ 10.03	\$ 22.24	\$ 23.65
Linerman Thermoplastic:	10.03	22.24	23.65

OVERTIME PAY

See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 20) on HOLIDAY PAGE

Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

One (1) year terms at the following wage rates:

1st Term:	\$ 15.00	\$ 15.00	\$ 15.00
2nd Term:	18.92	18.92	20.47
3rd Term:	25.22	25.22	27.30

Supplemental Benefits per hour:

1st term:	\$ 9.16	\$ 22.24	\$ 23.65
2nd Term:	10.03	22.24	23.65
3rd Term:	10.03	22.24	23.65

8-1456-LS

Painter - Metal Polisher **11/01/2023**

JOB DESCRIPTION Painter - Metal Polisher

DISTRICT 8

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2023
Metal Polisher	\$ 38.18
Metal Polisher*	39.28
Metal Polisher**	42.18

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

Journeyworker:
 All classification \$ 12.34

OVERTIME PAY

See (B, E, P, T) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
 Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:
 One (1) year term at the following wage rates:

	07/01/2023
1st year	\$ 16.00
2nd year	17.00
3rd year	18.00
1st year*	\$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	\$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:

Per hour:

1st year	\$ 8.69
2nd year	8.69
3rd year	8.69

8-8A/28A-MP

Plumber **11/01/2023**

JOB DESCRIPTION Plumber

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour:

	07/01/2023
Plumber and Steamfitter	\$ 62.36

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 41.51

OVERTIME PAY

See (B, E, E2, Q, V) on OVERTIME PAGE
OVERTIME:... See on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1)year terms at the following wages:

1st Term	\$ 23.20
2nd Term	26.61
3rd Term	30.74
4th Term	43.81
5th Term	46.99

Supplemental Benefits per hour:

1st term	\$ 17.12
2nd term	19.12
3rd term	22.74
4th term	30.02
5th term	31.82

8-21.1-ST

Plumber - HVAC / Service

11/01/2023

JOB DESCRIPTION Plumber - HVAC / Service

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Delaware: Only the townships of Middletown and Roxbury
Ulster: Entire County(including Walkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2023

HVAC Service \$ 42.68
+ \$ 4.37*

*Note: This portion of wage is not subject to overtime premium.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker HVAC Service
\$ 28.99

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 16, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

HVAC SERVICE

(1)year terms at the following wages:

1st yr. 2nd yr. 3rd yr. 4th yr. 5th yr.

\$ 19.32	\$ 22.91	\$ 28.56	\$ 35.13	\$ 38.15
+\$2.39*	+\$2.70*	+\$3.25*	+\$3.88*	+\$4.12*

*Note: This portion of wage is not subject to overtime premium.

Supplemental Benefits per hour:

Apprentices	07/01/2023
1st term	\$ 20.84
2nd term	22.28
3rd term	23.85
4th term	26.01
5th term	27.55

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations **11/01/2023**

JOB DESCRIPTION Plumber - Jobbing & Alterations

DISTRICT 8

ENTIRE COUNTIES
 Dutchess, Putnam, Westchester

PARTIAL COUNTIES
 Ulster: Entire county (including Walkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES
 Per hour: 07/01/2023
 Journeyworker: \$ 48.51

Repairs, replacements and alteration work is any repair or replacement of a present plumbing system that does not change existing roughing or water supply lines.

SHIFT WORK:
 When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS
 Per hour:
 Journeyworker \$ 34.76

OVERTIME PAY
 See (B, *E, E2, Q, V) on OVERTIME PAGE
 *When used as a make-up day, hours after 8 on Saturday shall be paid at time and one half.

HOLIDAY
 Paid: See (1) on HOLIDAY PAGE
 Overtime: See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES
 (1) year terms at the following wages:

1st year	\$ 20.92
2nd year	23.24
3rd year	25.29
4th year	35.48
5th year	37.49

Supplemental Benefits per hour:

1st year	\$ 11.45
2nd year	13.46
3rd year	17.51
4th year	23.67
5th year	25.68

8-21.3-J&A

Roofer **11/01/2023**

JOB DESCRIPTION Roofer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2023	05/01/2024
		Additional
Roofer/Waterproofeer	\$ 46.50	\$2.50
	+ \$7.00*	

* This portion is not subjected to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS

Per Hour:	\$ 31.37
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OVERTIME PAY

See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year term apprentices indentured prior to 01/01/2023

	1st	2nd	3rd	4th
	\$ 16.28	\$ 23.25	\$ 27.90	\$ 34.88
		+ 3.50*	+ 4.20*	+ 5.26*
Supplements:				
	1st	2nd	3rd	4th
	\$ 4.03	\$ 15.85	\$ 18.95	\$ 23.61

* This portion is not subjected to overtime premiums.

(1) year term apprentices indentured after 01/01/2023

	1st	2nd	3rd	4th	5th
	\$ 17.67	\$ 20.93	\$ 23.25	\$ 27.90	\$ 34.88
		+ 3.16*	+ 3.50*	+ 4.20*	+ 5.26
Supplements:					
	1st	2nd	3rd	4th	5th
	\$ 7.61	\$ 14.29	\$ 15.85	\$ 18.95	\$ 23.61

* This portion is not subjected to overtime premiums.

9-8R

Sheetmetal Worker

11/01/2023

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2023
SheetMetal Worker	\$ 47.00
	+ 3.60*

*This portion is not subject to overtime premiums.

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:
10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker	\$ 45.62
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OVERTIME PAY

OVERTIME:.. See (B, E, Q,) on OVERTIME PAGE.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 17.50	\$ 19.67	\$ 21.87	\$ 24.05	\$ 26.24	\$ 28.44	\$ 31.10	\$ 33.75
+ 1.44*	+ 1.62*	+ 1.80*	+ 1.98*	+ 2.16*	+ 2.34*	+ 2.52*	+ 2.70*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices

1st term	\$ 19.53
2nd term	21.99
3rd term	24.42
4th term	26.88
5th term	29.32
6th term	31.75
7th term	33.72
8th term	35.71

8-38

Sheetmetal Worker

11/01/2023

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 4

ENTIRE COUNTIES

Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester

WAGES

Per Hour: 07/01/2023

Sign Erector \$ 56.00

NOTE: Structurally Supported Overhead Highway Signs(See STRUCTURAL IRON WORKER CLASS)

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

Sign Erector \$ 55.66

OVERTIME PAY

See (A, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE

Overtime: See (5, 6, 10, 11, 12, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Per Hour:

6 month Terms at the following percentage of Sign Erectors wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
35%	40%	45%	50%	55%	60%	65%	70%	75%	80%

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2023

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 14.95	\$ 16.95	\$ 18.93	\$ 20.93	\$ 28.56	\$ 31.05	\$ 33.57	\$ 36.05	\$ 38.56	\$ 41.05

4-137-SE

Sprinkler Fitter

11/01/2023

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

Per hour 07/01/2023

Sprinkler \$ 50.86

Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journey person \$ 30.19

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES

Wages per hour

One Half Year terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 24.77	\$ 27.53	\$ 30.03	\$ 32.78	\$ 35.53	\$ 38.29	\$ 41.04	\$ 43.79	\$ 46.54	\$ 49.30

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.74	\$ 8.74	\$ 20.32	\$ 20.32	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57 1-669.2

Teamster - Building / Heavy&Highway 11/01/2023

JOB DESCRIPTION Teamster - Building / Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

GROUP A: Straight Trucks (6-wheeler and 10-wheeler), A-frame, Winch, Dynamite Seeding, Mulching, Agitator, Water, Attenuator, Light Towers, Cement (all types), Suburban, Station Wagons, Cars, Pick Ups, any vehicle carrying materials of any kind.

GROUP AA: Tack Coat

GROUP B: Tractor & Trailers (all types).

GROUP BB: Tri-Axle, 14 Wheeler

GROUP C: Low Boy (carrying equipment).

GROUP D: Fuel Trucks, Tire Trucks.

GROUP E: Off-road Equipment (over 40 tons): Athey Wagons, Belly Dumps, Articulated Dumps, Trailer Wagons.

GROUP F: Off-road Equipment (over 40 tons) Euclid, DJB.

GROUP G: Off-road Equipment (under 40 tons) Athey Wagons, Belly Articulated Dumps, Trailer Wagons.

GROUP H: Off-road Equipment (under 40 tons), Euclid.

GROUP HH: Off-road Equipment (under 40 tons) D.J.B.

GROUP I: Off-road Equipment (under 40 tons) Darts.

GROUP II: Off-road Equipment (under 40 tons) RXS.

WAGES:(per hour)

07/01/2023

GROUP A	\$ 46.86*
GROUP AA	49.86*
GROUP B	47.48*
GROUP BB	46.98*
GROUP C	49.61*
GROUP D	47.31*
GROUP E	47.86*
GROUP F	48.86*
GROUP G	47.61*
GROUP H	48.23*
GROUP HH	48.61*
GROUP I	48.36*
GROUP II	48.73*

* To calculate premium wage, subtract \$.10 from the hourly wage.

Note: Fuel truck operators on construction sites addit. \$5.00 per day.
For work on hazardous/toxic waste site addit. 20% of hourly rate.

Shift Differential: When mandated by the contracting agency, DOT, or any governmental agency contracts shall receive a shift differential of fifteen (15%) above the wage rate.

NOTE: The Employer Registration (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects Four (4), Ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker

First 40 hours	\$ 35.58
41st-45th hours	15.73
Over 45 hours	1.60

OVERTIME PAY

See (B, E, P, R) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE

8-456

Welder

11/01/2023

JOB DESCRIPTION Welder

DISTRICT 1

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuylar, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour 07/01/2023

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

- (AA) Time and one half of the hourly rate after 7 and one half hours per day
- (A) Time and one half of the hourly rate after 7 hours per day
- (B) Time and one half of the hourly rate after 8 hours per day
- (B1) Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday.
Double the hourly rate for all additional hours
- (B2) Time and one half of the hourly rate after 40 hours per week
- (C) Double the hourly rate after 7 hours per day
- (C1) Double the hourly rate after 7 and one half hours per day
- (D) Double the hourly rate after 8 hours per day
- (D1) Double the hourly rate after 9 hours per day
- (E) Time and one half of the hourly rate on Saturday
- (E1) Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
- (E2) Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E3) Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
- (E4) Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
- (E5) Double time after 8 hours on Saturdays
- (F) Time and one half of the hourly rate on Saturday and Sunday
- (G) Time and one half of the hourly rate on Saturday and Holidays
- (H) Time and one half of the hourly rate on Saturday, Sunday, and Holidays
- (I) Time and one half of the hourly rate on Sunday
- (J) Time and one half of the hourly rate on Sunday and Holidays
- (K) Time and one half of the hourly rate on Holidays
- (L) Double the hourly rate on Saturday
- (M) Double the hourly rate on Saturday and Sunday
- (N) Double the hourly rate on Saturday and Holidays
- (O) Double the hourly rate on Saturday, Sunday, and Holidays
- (P) Double the hourly rate on Sunday
- (Q) Double the hourly rate on Sunday and Holidays
- (R) Double the hourly rate on Holidays
- (S) Two and one half times the hourly rate for Holidays

- (S1) Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.
- (T) Triple the hourly rate for Holidays
- (U) Four times the hourly rate for Holidays
- (V) Including benefits at SAME PREMIUM as shown for overtime
- (W) Time and one half for benefits on all overtime hours.
- (X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

- (1) None
- (2) Labor Day
- (3) Memorial Day and Labor Day
- (4) Memorial Day and July 4th
- (5) Memorial Day, July 4th, and Labor Day
- (6) New Year's, Thanksgiving, and Christmas
- (7) Lincoln's Birthday, Washington's Birthday, and Veterans Day
- (8) Good Friday
- (9) Lincoln's Birthday
- (10) Washington's Birthday
- (11) Columbus Day
- (12) Election Day
- (13) Presidential Election Day
- (14) 1/2 Day on Presidential Election Day
- (15) Veterans Day
- (16) Day after Thanksgiving
- (17) July 4th
- (18) 1/2 Day before Christmas
- (19) 1/2 Day before New Years
- (20) Thanksgiving
- (21) New Year's Day
- (22) Christmas
- (23) Day before Christmas
- (24) Day before New Year's
- (25) Presidents' Day
- (26) Martin Luther King, Jr. Day
- (27) Memorial Day
- (28) Easter Sunday

(29) Juneteenth

**New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12226**

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By:

(Check Only One) Contracting Agency Architect or Engineering Firm Public Work District Office Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address (Check if new or change)

Telephone _____ Fax _____

E-Mail: _____

2. NY State Units (see Item 5).

- | | |
|---|--|
| <input type="checkbox"/> 01 DOT | <input type="checkbox"/> 07 City |
| <input type="checkbox"/> 02 OGS | <input type="checkbox"/> 08 Local School District |
| <input type="checkbox"/> 03 Dormitory Authority | <input type="checkbox"/> 09 Special Local District, i.e.,
Fire, Sewer, Water District |
| <input type="checkbox"/> 04 State University
Construction Fund | <input type="checkbox"/> 10 Village |
| <input type="checkbox"/> 05 Mental Hygiene
Facilities Corp. | <input type="checkbox"/> 11 Town |
| <input type="checkbox"/> 06 OTHER N.Y. STATE UNIT | <input type="checkbox"/> 12 County |
| | <input type="checkbox"/> 13 Other Non-N.Y. State
(Describe) |

3. SEND REPLY TO (check if new or change)
Name and complete address:

Telephone _____ Fax _____

E-Mail: _____

4. SERVICE REQUIRED. Check appropriate box and provide project information.

- New Schedule of Wages and Supplements.
APPROXIMATE BID DATE : _____
- Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR
THIS PROJECT : _____

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____

Description of Work _____

Contract Identification Number _____

Note: For NYS units, the OSC Contract No. _____

6. Location of Project:

Location on Site _____

Route No/Street Address _____

Village or City _____

Town _____

County _____

7. Nature of Project - Check One:

1. New Building
2. Addition to Existing Structure
3. Heavy and Highway Construction (New and Repair)
4. New Sewer or Waterline
5. Other New Construction (Explain)
6. Other Reconstruction, Maintenance, Repair or Alteration
7. Demolition
8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- | | |
|--|---|
| <input type="checkbox"/> Construction (Building, Heavy
Highway/Sewer/Water) | <input type="checkbox"/> Fuel Delivery |
| <input type="checkbox"/> Tunnel | <input type="checkbox"/> Guards, Watchmen |
| <input type="checkbox"/> Residential | <input type="checkbox"/> Janitors, Porters, Cleaners,
Elevator Operators |
| <input type="checkbox"/> Landscape Maintenance | <input type="checkbox"/> Moving furniture and
equipment |
| <input type="checkbox"/> Elevator maintenance | <input type="checkbox"/> Trash and refuse removal |
| <input type="checkbox"/> Exterminators, Fumigators | <input type="checkbox"/> Window cleaners |
| <input type="checkbox"/> Fire Safety Director, NYC Only | <input type="checkbox"/> Other (Describe) |

9. Does this project comply with the Wicks Law involving separate bidding? YES NO

10. Name and Title of Requester

Signature



NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

**LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE
AWARDED ANY PUBLIC WORK CONTRACT**

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: <https://apps.labor.ny.gov/EDList/searchPage.do>

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 11/08/2023

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	*****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL	*****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL	*****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	*****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025
DOL	DOL	*****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	*****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTION	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028

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DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC	*****2117	CHARAN ELECTRICAL ENTERPRISES		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		CRAIG JOHANSEN		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
DOL	DOL	*****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLSTON NY 11363	01/14/2019	01/14/2024
DOL	DOL	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL		EFTIS GROUP INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	NYC	*****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA	*****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027

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DOL	DOL		IRENE KASELIS		32 PENNINGTON AVE WALDWICK NJ 07463	05/30/2019	05/30/2024
DOL	DOL	*****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.M.J CONSTRUCTION		151 OSTRANDER AVENUE SYRACUSE NY 13205	11/21/2022	11/21/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	12/12/2022	12/12/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****2435	JEFFEL D. JOHNSON	JMJ7 AND SON	5553 CAIRNSTRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JEFFEL JOHNSON ELITE CARPENTER REMODEL AND CONSTRUCTION		C2 EVERGREEN CIRCLE LIVERPOOL NY 13090	11/21/2022	11/21/2027
DOL	DOL	*****2435	JEFFREY M. JOHNSON	JMJ7 AND SON	5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		JMJ7 & SON CONSTRUCTION, LLC		5553 CAIRNS TRAIL LIVERPOOL NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 AND SONS CONTRACTORS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS		7014 13TH AVENUE BROOKLYN NY 11228	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS AND SONS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS, LLC		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JOSEPH K. SALERNO		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL		JOSEPH K. SALERNO II		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027

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DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING	3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING	3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING	3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC	531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC	531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JRN PAVING, LLC	531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JRN PAVING, LLC	531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JULIUS AND GITA BEHREND	5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KARIN MANGIN	796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR	7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL	*****2959	KELC DEVELOPMENT, INC	7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER	7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		KMA GROUP II, INC.	29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	*****1833	KMA GROUP INC.	29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KMA INSULATION, INC.	29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	NYC		KULWANT S. DEOL	9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION	150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LEROY E. NELSON JR	531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		LEROY E. NELSON JR	531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	AG	*****3291	LINTECH ELECTRIC, INC.	3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DOL		LOUIS A. CALICCHIA	1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA	27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.	27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL	*****2196	MAINSTREAM SPECIALTIES, INC.	11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DA		MANUEL P TOBIO	150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO	150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	NYC		MAREK FABIJANOWSKI	50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC		MARIA NUBILE	84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL		MATTHEW P. KILGORE	4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION	704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024
DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC	325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC	14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.	42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.	42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	NYC		MUHAMMED A. HASHEM	524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025

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DOL	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL	*****7790	NATIONAL BUILDING & RESTORATION CORP		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****1797	NATIONAL CONSTRUCTION SERVICES, INC		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DA	*****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DA		NICHOLAS T. ANALITIS		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTI ON, INC.	444 SCHANTZ ROAD ALLEN TOWN PA 18104	09/17/2020	09/17/2025
DOL	NYC	*****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL		PETER STEVENS		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP.		3 PARK CIRCLE MIDDLETOWN NY 10940	07/11/2022	07/11/2027
DOL	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
DOL	DOL	*****9148	RICH T CONSTRUCTION		107 WILLOW WOOD LANE CAMILLUS NY 13031	11/13/2018	11/13/2023
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	11/13/2018	11/13/2023
DOL	DOL		ROBBYE BISSE SAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	*****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RD POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026

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DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	DA	*****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	NYC	*****1130	SCANA CONSTRUCTION CORP.		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL	*****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		SILVANO TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPASTEFANO, JR. A/K/A STEVE PAPASTEFANO, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****9150	SURGE INC.		8269 21ST STREET BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL	*****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	*****6789	TEST1000		P.O BOX 123 ALBANY NY 12044	03/01/2021	03/01/2026
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DA	*****1050	TRI STATE CONSTRUCTION OF NY CORP.		50-39 175TH PLACE FRESH MEADOWS NY 11365	03/28/2022	03/28/2027
DOL	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026

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DOL	DOL	*****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	*****2426	VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL	*****8266	WILLIAM CHRIS MCCLENDON	MCCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCCLENDON		1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	*****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTIN G, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
DOL	DOL		XENOFON EFTHIMIADIS		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project Identification
- B. Work covered by Contract Documents
- C. Work Sequence
- D. Contractor use of Premises
- E. Occupancy Requirements

1.2 RELATED REQUIREMENTS

- A. Section 01 50 00 - Temporary Facilities and Controls

1.3 PROJECT

- A. Project Name: Capital Improvements Project Phase 2
Contract Documents, dated November 14, 2023, and revised June 24, 2024 were prepared for the Project by Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC, Airport Corporate Park, 100 Hunt Center, Horseheads, NY 14845-1019.
- B. Owner's Name: Pocantico Hills Central School District.
599 Bedford Road
Sleepy Hollow, NY 10591
- C. Architect's Name: Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC.
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845-1019
Phone: 607-358-1000
Fax: 607-358-1800
Contact: Mike Jones
- D. Construction Manager: LeChase
Contact: Monica Rivera
- E. The Project consists of the construction of Additions & Alterations for Classroom Expansion/Renovations, Food Service/Kitchen & Cafeteria Renovations, Fitness Center, New Pavilion Structure, and HVAC and Electrical Improvements..

1.4 CONTRACT DESCRIPTION

- A. The project will be constructed under a multiple Prime Contract Agreement.
 - 1. Prime Contracts are separate contracts between the Owner and independent contractors, representing significant construction activities. Each Prime Contract is performed concurrently, and closely coordinated, with construction activities performed on the Project under other Prime Contracts.
- B. Prime Contracts for this Project include:
 - 1. Bid Prime Contracts:
 - a. General Trades

- b. Mechanical
 - c. Electrical
 - d. Plumbing
 - e. Food Service
 - f. The work of each separate Bid Prime Contract is identified in this section .
2. Cooperative Purchase Prime Contracts:
- a. Controls:
 - 1) Mechanical Controls.
 - 2) Access Controls.
 - b. The work of each separate Cooperative Purchase Prime Contract is identified in this section .

1.5 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.
 - 1. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions of the building.
 - 2. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of the building. However, the Owner will not clean up behind contractors; responsibility for any debris caused by contractor operations remains with the Prime Contractor.
- D. The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided that such occupancy does not interfere with completion of the work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total work. Cooperate fully with the Owner or its representatives and Architect/Engineer during construction operations to minimize conflicts and facilitate owner's usage.

1.6 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings. Do not disturb portions of the site beyond the areas in which the work is indicated.
- B. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Others.
 - 3. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - a. All exit and escape windows shall be maintained at all times.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
 - 3. Do not use driveways, entrances or sidewalks for parking or storage of materials.
 - 4. Keep temporary driveways and entrances serving the premises clear and available to the Owner, Architect, Construction Manager and emergency vehicles at all times.
- D. Existing building spaces may not be used for storage.
- E. Time Restrictions:

1. Work hours shall be between the hours of 8:00 AM and 5:00 PM daily, Monday through Friday, except when it interferes with the Owner's activities.
 - a. Shift work between the hours of 3:00 PM and 7:00 AM, or on weekends, may occur with the permission the Construction Manager.
 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- F. Any work that requires disruption to the occupants, entry/exits, utilities, etc shall be coordinated with and approved by the Construction Manager.
- G. Utility Outages and Shutdown:
1. Limit disruption of utility services to hours the building is unoccupied.
 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 3. Prevent accidental disruption of utility services to other facilities.
- H. Construction Staging Area:
1. Contractors will be instructed to use designated staging/parking areas before start of construction.
 2. All staging of equipment, trailers, storage containers, etc to be coordinated through the Construction Manager and cannot interfere with any other Contractor's work.
 3. Activity in the staging area shall be conducted in a manner that causes minimal disruption of the Owner's activities.

1.7 WORK SEQUENCE

- A. All Work will be conducted in a number of continuous phases to provide the least possible interference to the activities of the Owner's personnel and to permit the facilities to be partially utilized during implementation of the work.
1. The Contractor is expressly forewarned that impacts to the construction schedule during any phase or portion of the project will not be permitted.
- B. Schedule: Refer to the milestone / phasing schedule included in Section 01 32 16 - Construction Progress Schedule.
- C. Should overtime or second shift work be required by a Prime Contractor to ensure the completion within the specified (phased) schedule, all costs for this work is the responsibility of the Contractor. The Construction Manager shall have the authority to direct the contractors and subcontractors to work overtime including weekends to maintain the schedule at no additional cost to the Owner. Prime Contractors warrant that the work shall be physically complete, including punch list, startup, and commissioning, within the early start and late finish schedule milestones.
- D. Each Prime Contractor shall provide multiple crews to maintain project schedule. Each crew is to be furnished with its own supervision, cranes, scaffold and other means necessary to maintain the Project Schedule.
- E. The intention of the work is to follow a logical sequence; however, the Prime Contractor may be required by the Construction Manager to temporarily omit or leave out any section of his work, or perform his work out of sequence. All such out of sequence work and returning to these areas shall be at no additional cost to the Owner.
- F. Each Contractor is responsible for supervision of their Sub-Contractors at all times.

1.8 REQUIREMENTS OF ALL CONTRACTS

- A. Extent of Contract: Unless the Contract Documents contain a more specific description of the Work, names and terminology on Drawings and in Specification Sections determine which contract includes a specific element of Project.

1. Unless otherwise indicated, the Work described in this section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Local custom and trade-union jurisdictional settlements do not control the scope of the Work of each contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, affected contractors shall negotiate a reasonable settlement to avoid or minimize interruption and delays.
 3. Trenches, at the interior of building footprints, whether existing or planned, for the Work of each contract shall be provided by each Contractor for its own Work.
 - a. For trenches at existing interior concrete slabs on grade:
 - 1) The Contractor requiring the trench shall mark out location of required trench.
 - 2) The General Trades contractor shall saw cut and remove the concrete.
 - 3) The Contractor requiring the trench shall excavate; install the work; backfill and compact up to the subbase level.
 - 4) The General Trades contractor shall install the base material and replace the concrete slab as detailed on the Drawings.
 - 5) The General Trades Contractor shall patch floor finishes to match or as detailed or scheduled on Drawings.
 - 6) All Contractors shall refer to Contract Documents for applicable specification sections and details.
 4. Cutting and patching for the Work of each contract shall be provided by each contractor for its own Work, except as outlined for trenches above.
 5. Firestopping for the Work of each contract shall be provided by each contractor for its own Work.
 6. Within ten (10) working days after preliminary horizontal bar-chart-type construction schedule submittal has been received from General Trades Contractor, submit a matching preliminary horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
- B. One set of documents is issued covering all Prime Contracts. EACH PRIME CONTRACTOR shall be responsible for all work shown on all drawings and sections for complete understanding and knowledge of the work. All Prime Contractors are responsible for all work under their contract no matter what drawing, specification or related specification in which that work appears, including drawings of other trade disciplines.
- C. The Following Drawings and Specifications are specifically included and defined as integral to EACH Prime Contract:
1. Drawings:
 - a. G1.1 - Symbols and Abbreviations.
 - b. CO Series - Code Compliance Plans.
 2. Specifications:
 - a. Division 01 - General Requirements:
 - 1) All Specification Sections within this Division are owned by ALL contracts.
 - b. Division 02 - Existing Conditions:
 - 1) Specification Section 02 41 00 – Selective Structural Demolition
 - c. Division 07 - Thermal and Moisture Protection
 - 1) Specification Section 07 84 00 - Firestopping:
 - (a) All contractors to provide Firestopping for their own trade's penetrations through all fire-rated walls.
 - 2) Specification Section 07 92 00 - Joint Protection:
 - (a) All contractors to provide joint protection of their own trade's work.
 - d. Division 08 - Openings:
 - 1) Specification Section 08 31 00 - Access Doors and Panels
 - (a) All contractors to furnish Access Doors and Panels for their own trade's work.
 - (b) Access Doors and Panels to be installed by General Trades Contractor.

- (c) Include locations of Access Doors and Panels in shop drawings and furnish to General Trades Contractor.
- e. Division 09 - Finishes
 - 1) All contractors to refer to Div. 09 Specifications and Room Finish Schedule and all Finish Keys within drawings in coordination with all finishes for each trade.
- D. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the Work.
- E. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Section 01 50 00 - Temporary Facilities and Controls, each contractor is responsible for the following:
 - 1. The Contractors shall assist the Architect and Owner in identifying a plan detailing how exiting required by the applicable building code will be maintained, and a plan detailing how adequate ventilation will be maintained during construction.
 - 2. Installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, and costs and use charges associated with each facility.
 - 3. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 - 4. Its own field office, complete with necessary furniture, utilities, and telephone service. The Contractor shall provide leveling, stone, and/or removals necessary to install Field Offices. At end of construction, when field offices are removed, each Contractor is responsible to return the area to its original condition, including any re-seeding required.
 - 5. Its own storage and fabrication sheds.
 - 6. Temporary enclosures for its own construction activities.
 - 7. Hoisting requirements for its own construction activities, including hoisting material or equipment into spaces below grade, and hoisting requirements outside building enclosure.
 - 8. Progress cleaning of its own areas on a daily basis.
 - 9. Secure lockup of its own tools, materials, and equipment.
 - 10. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
- F. Temporary Heating, Cooling and Ventilation: The HVAC Contract is responsible for temporary heating, cooling, and ventilation.

1.9 BID CONTRACT NO. 1 - GENERAL CONSTRUCTION

- A. The General Trades Contractor shall be responsible for all work shown on Abatement (AB), Architectural (A), Landscape (L), and Structural (S) Drawings unless noted otherwise and any site work shown on all other drawings and further defined below:
 - 1. Provide the complete work of Division 02 - Existing Conditions unless noted otherwise.
 - 2. Division 03 - Concrete
 - a. Specification Section 03 30 00 - Cast-In-Place Concrete including but not limited to:
 - 1) Provide equipment pads for all trades (all primes to lay out own concrete pads for GC installation).
 - 2) Provide cutting/patching for all trenches within the building (layout of trenches by each Prime Contractor).
 - 3) Interior slabs and all building foundations.
 - b. Provide the complete work of Specification Section 03 54 00 - Cast Underlayment.
 - 3. Provide the complete work of Division 04 - Masonry.
 - 4. Provide the complete work of Division 05 - Metals.
 - 5. Provide the complete work of Division 06 - Wood, Plastic and Composites.
 - a. Provide ALL wood blocking on this project

- b. Coordinate wood blocking with all other Primes and any Owner furnished equipment to ensure all wood blocking is in place prior to wall enclosure. Cutting and patching after wall enclosure will be at the cost of the General Contractor.
 6. Provide the complete work of Division 07 - Thermal and Moisture Protection, with the following exceptions:
 - a. Install all curbs and rails for rooftop mechanical equipment, as furnished by the Mechanical Contractor.
 - b. Install all louvers and required flashing for mechanical equipment, as furnished by the Mechanical Contractor.
 - c. Provide all wall, roof, and floor penetrations for mechanical equipment and duct openings. Provide associated structural support.
 7. Provide the complete work of Division 08 - Openings as noted:
 - a. Install Access Doors and Panels furnished by other contractors.
 - b. Section 08 71 00 - Door Hardware
 - 1) Power, Access Control, and Fire Alarm wiring and final connections provided by Electrical Contractor and/or Access Control Integrator.
 8. Provide the complete work of Division 09 - Finishes, unless noted otherwise.
 9. Provide the complete work of Division 10 - Specialties.
 10. Provide the complete work of Division 11 - Equipment, with the following exceptions:
 - a. Specification Section 11 40 00 - Foodservice Equipment to be provided by the Food Service Contractor.
 11. Provide the complete work of Division 12 - Furnishings.
 12. Provide the complete work of Division 13 - Special Construction.
 13. Provide the complete work of Division 31 - Earthwork with the following exceptions:
 - a. Specification Section 31 23 16.13 - Trenching:
 - 1) Interior trenching for utilities shall be provided by Contractor requiring trench, as outlined in previous article.
 - 2) Provide exterior trenching for all trades.
 - b. Specification Section 31 23 23 - Fill:
 - 1) Fill for interior trenches for utilities shall be provided by Contractor backfilling trench, as outlined in previous article.
 14. Provide the complete work of Division 32 - Exterior Improvements
 15. Provide the complete work of Division 33 - Utilities
- B. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all General Trades Work in accordance with the Contract Documents and all applicable codes having jurisdiction.
- C. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.10 BID CONTRACT NO. 2 - FOODSERVICE EQUIPMENT

- A. The Food Service Contractor shall be responsible for all work shown on Kitchen Equipment (K) / (FS) Drawings unless noted otherwise and any food service work shown on all other drawings and further defined below:
1. Division 11 - Equipment
 - a. Provide the complete work of SPECIFICATION SECTION 11 40 00 - FOOD SERVICE EQUIPMENT
 - 1) Connections by others as indicated on FS drawings.

1.11 BID CONTRACT NO. 3 - PLUMBING

- A. The Plumbing Contractor shall be responsible for all work shown on the Plumbing (P) Drawings and any plumbing work shown on all other drawings and specifications and further defined below:
1. Division 02 - Existing Conditions:
 - a. Specification Section 02 41 00 – Selective Structural Demolition:
 - 1) Plumbing Contractor to be responsible for all demolition of items shown on plumbing drawings as well as all plumbing connections to equipment or devices to be demolished by other contractors.
 2. Division 11 - Equipment:
 - a. Specification Section 11 40 00 - Foodservice Equipment
 - 1) Provide plumbing connections.
 3. Provide the complete work of Division 22 - Plumbing.
 4. Division 28 - Electronic Safety and Security: Coordinate and test proper connection to Buildings Fire Alarm System.
- B. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all Plumbing Work in accordance with the Contract Documents and all applicable codes having jurisdiction.
- C. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.12 BID CONTRACT NO. 4 - MECHANICAL

- A. The Mechanical Contractor shall be responsible for all work shown on the Mechanical (H) Drawings and any mechanical work shown on all other drawings and specifications and further defined below:
1. Division 02 - Existing Conditions:
 - a. Specification Section 02 41 00 – Selective Structural Demolition
 - 1) Mechanical Contractor to be responsible for all demolition of items shown on Mechanical Drawings as well as all mechanical connections to equipment or devices to be demolished by other contractors.
 2. Division 11 - Equipment:
 - a. Specification Section 11 40 00 - Food Service Equipment
 - 1) Provide HVAC connections.
 3. Division 22 - Plumbing:
 - a. Specification Section 22 10 05 - Plumbing Piping And Specialties limited to:
 - 1) Final connections of equipment condensate made by HVAC Contractor. Storm Water taps provided by Plumbing Contractor.
 4. Provide the complete work of Division 23 - Heating, Ventilating and Air-Conditioning (HVAC), with the following exceptions:
 - a. Furnish all curbs and rails for rooftop mechanical equipment and turn over to the General Trades Contractor for installation.
 - b. Furnish all louvers and required flashing for mechanical units and turn over to the General Trades Contractor for installation.
- B. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all Mechanical Work in accordance with the Contract Documents and all applicable codes having jurisdiction.

- C. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.13 BID CONTRACT NO. 5 - ELECTRICAL

- A. The Electrical Contractor shall be responsible for all work shown on Electrical (E) and Technology (T) Drawings unless noted otherwise, and any electrical work shown on all other drawings and further defined below:
 - 1. Division 02 - Existing Conditions:
 - a. Specification section 02 41 00 - Selective Structural Demolition:
 - 1) Electrical contractor to be responsible for all demolition of items shown on electrical drawings as well as all electrical feeds to equipment or devices to be demolished by other contractors.
 - 2. Division 06 - Wood, Plastic and Composites:
 - a. Specification Section 06 41 00 - Architectural Wood Casework including but not limited to:
 - 1) Any lighting, power, and electrical work associated with Architectural Wood Casework
 - 3. Division 08 - Openings:
 - a. Specification Section 08 71 00 - Door Hardware including but not limited to:
 - 1) Fire Alarm connection at all electrically operated hardware.
 - 2) Provide power to all electrically operated hardware.
 - 4. Division 11 - Equipment:
 - a. Specification Section 11 40 00 - Foodservice Equipment including but not limited to:
 - 1) Provide ALL electrical connections.
 - 5. Division 22 - Plumbing:
 - a. Specification Section 22 30 00 - Plumbing Equipment including but not limited to:
 - 1) Provide power and electrical connections to Plumbing equipment.
 - 6. Division 23 - Heating, Ventilating and Air-Conditioning (HVAC):
 - a. Provide electrical connections to all HVAC pumps, equipment, units, controllers, and mechanical systems and accessories.
 - 7. Provide complete the work of Division 26 - Electrical.
 - 8. Provide the complete work of Division 27 - Communications
 - 9. Provide the complete work of Division 28 - Electronic Safety and Security
 - a. Specifications 28 10 00 & 28 20 00 shall be reviewed and performed in coordination with the work of the Co-Op Controls Contractor.
- B. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all Electrical Work in accordance with the Contract Documents and all applicable codes having jurisdiction.
- C. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.
- D. The Contractor shall provide Installer Certification as part of the descoping process as outlined in the Submittals portion of Section 27 10 05 - Communications Copper Cabling.

1.14 COOPERATIVE PURCHASE PRIME CONTRACT NO. 6 - CONTROLS

- A. The Controls Contractor shall be responsible for all controls work shown on Mechanical (H), Landscape (L), Electrical (E), and Technology (T) Drawings unless noted otherwise, and any controls work shown on all other drawings and further defined below:
 - 1. Division 08 - Openings

- a. Specification Section 08 71 00 - Door Hardware:
 - 1) Provide access control circuitry to all electrically integrated access control operated door hardware.
 2. Division 23 - Heating, Ventilating, and Air-conditioning:
 - a. Provide the complete work of Specification Section 23 09 23 - Direct Digital Control System for HVAC.
 - b. Provide the complete work of Specification Section 23 09 93 - Sequence of Operations for HVAC Controls.
 - c. Coordinate this work with the Mechanical Contractor.
 3. Division 28 - Electronic Safety and Security:
 - a. Provide the complete work of Specification Section 28 10 00 - Access Control.
 - 1) Provide all integrated access control hardware designated by Div. 28 in Specification Section 08 71 00.
 - b. Provide the complete work of Specification Section 28 20 00 - Video Surveillance, except:
 - 1) Conduit, pathways and cable provided by Electrical Contractor.
 - 2) Furnish equipment to be installed by Electrical Contractor as outlined in the responsibility matrix.
- B. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all Controls Work in accordance with the Contract Documents and all applicable codes having jurisdiction.
- C. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.15 ADDITIONAL NOTES TO CONTRACT DOCUMENTS

- A. The following notes are integral to each Prime Contract:
1. All bidders are forewarned to review all information of the Contract Documents.
 2. Review Section 01 22 00 for Unit Prices that may be included in Prime Contractors scope of work.
 3. Review Section 01 23 00 for Alternate bid pricing required in Prime Contractors scope of work.
 4. Review Section 01 50 00 for work requirements of temporary construction activities in Prime Contractor's scope of work.
 5. All contractors are responsible for the layout and survey of their own work or work requirements.
 6. All contractors are required to construct the project per the phasing and staging plan. Specific areas of the site and building must be completed for the intended use by the Owner, at the Milestone dates so listed. All contractors shall cooperate fully with the intentions of the plan. Contractors are forewarned that any delay caused indirectly or directly by the acts, omissions, and/or failure to perform by a contractor will result in the Owner, or its agents, accomplishing the work by any means possible. The contractor causing the delay will be responsible for any and all costs associated with such issues, including Owner costs, Architect/Engineer costs, inspections, etc.
 7. All Contractors shall provide any and all temporary shoring, bracing, supports or protection systems necessary to expedite the work requirements including the maintenance of worker safety.
 8. All contractors are responsible for the safety of their own workers, subcontractors, work area, and other personnel on site. Each and every contractor is responsible for maintaining a safe work site and utilizing best safety procedures.
 9. In case of discrepancy between the Drawings and Specifications, interpretation shall be given preference in the following order, with later dates taking precedence over earlier dates:

- a. Addenda
 - b. Amendments to the Drawings and Specifications
 - c. Drawings and Specifications
 - d. Schedules, Piping & Wiring Diagrams take precedence over other data shown on the drawings.
 - e. Notes take precedence over other data shown on the drawings, except Schedules, Piping & Wiring Diagrams.
10. If discrepancies are found between the plans and specifications, include the more costly detail to the bid price.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONSTRUCTION MANAGER

- A. Coordination activities of the Construction Manager include, but are not limited to, the following:
1. Provide overall coordination of the Work.
 2. Provide overall coordination of temporary facilities and controls.
 3. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
 4. Coordinate construction and operations of the Work with work performed by each contract.
 5. Coordinate sequencing and scheduling of the Work. Include the following:
 - a. Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with separate contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
 - b. Distribute copies of schedules to Architect, Owner, and separate contractors.
 6. Provide construction photography.
 7. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
 8. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction.
 9. Coordinate cutting and patching.
 10. Coordinate protection of the Work

3.2 COORDINATION

- A. Each Prime Contractor shall coordinate scheduling and installation of work with the work of other Contractors, sub-contractors and other trades. Each Prime Contractor is also required to coordinate all work of their Contract with Owner-supplied materials, direct contacts and normal building operations.
- B. Each Prime Contractor shall supply and coordinate exact locations of embedded items in concrete or masonry work with the General Contractor. Each Prime Contractor shall monitor such items throughout concrete/masonry activities to ensure proper placement.
- C. MECHANICAL, ELECTRICAL, AND PLUMBING Prime Contractors shall be responsible for providing any rough opening or masonry opening dimensions to the General Trades Contractor. FOR ALL NEW WORK. MECHANICAL, ELECTRICAL, AND PLUMBING Prime Contractors shall be responsible for any rework or additional work required due to their failure to provide this information prior to the schedule start of wall construction.

- D. Each Contractor shall coordinate all device and rough-in locations required with the casework shop drawings.
- E. Each Contractor shall take special care in verifying that his equipment matches the characteristic of the power being supplied. The Electrical Contractor shall coordinate electrical power requirements with Each Contractor for all equipment requiring power

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule of Values.
- B. Applications for payments.
- C. Change procedures.

1.2 RELATED REQUIREMENTS

- A. Section 00 52 14 - Standard Form of Agreement: Contract Sum, retainages, payment period, monetary values of unit prices.
- B. Section 00 72 14 - General Conditions of the Contract for Construction: Additional requirements for progress payments, final payment, changes in the Work.
- C. Section 01 22 00 - Unit Prices: Monetary values of unit prices; Payment and modification procedures relating to unit prices.
- D. Section 01 30 00 - Administrative Requirements: General submittal procedures.
- E. Section 01 60 00 - Product Requirements: Substitution limitations and procedures.
- F. Section 01 70 00 - Execution and Closeout Requirements: Project record documents.

1.3 SCHEDULE OF VALUES

- A. Submit completed schedule on Form: AIA G703 - Continuation Sheet for G702.
- B. Submit Schedule of Values electronically within 15 days after date of Owner-Contractor Agreement established in Notice to Proceed.
- C. Include separately for each line item, the amount for materials, and the amount for labor
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.
 - 1. Separate by SED numbers, listing SED number and Building name. When applicable, further separate each building by additional and alterations, include a subtotal for each.
- E. Provide 1% of contract value for execution of closeout documents.
- F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.

- B. Use Form AIA G732 and Form AIA G703, edition stipulated in the Agreement.
- C. Content and Format: Use data from approved Schedule of Values for listing items in Application for Payment.
- D. Submit electronically each Application for Payment.
- E. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 30 00.
 - 2. Construction progress schedule, revised and current as specified in Section 01 32 16.
- F. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include with Application for Payment:
 - 1. Partial release of liens from major subcontractors and vendors.
 - 2. Project record documents as specified in Section 01 78 00, for review by Owner which will be returned to the Contractor.
 - 3. Affidavits attesting to off-site stored products.
 - 4. Certified payrolls.
 - 5. Updated project schedule and timelines.

1.5 CHANGE PROCEDURES

- A. Change Order Forms: AIA G701 Change Order.
- B. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.
- C. For minor changes not involving an adjustment to the Contract Sum/Price or Contract Time, Architect will issue supplemental instructions on AIA Form G710 directly to Contractor.
- D. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum/Price or Contract Time.
 - 2. Promptly execute the change.
- E. The Architect/Engineer may issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change. Contractor shall prepare and submit a estimated price quotation within 15 days.
- F. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.
- G. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's price quotation.
 - 2. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit prices. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
 - 3. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will

- describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
4. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
 - a. Maintain daily detailed records of work completed on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work. Daily Time and Material tickets must be validated and signed by the Owner's Representative to be acceptable for issuance of the change order.
 - H. Substantiation of Costs: Provide full information for change in cost or time with sufficient data to allow evaluation of quotation..
 - I. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
 - J. Correlation of Contractor Submittals:
 1. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.
 2. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 3. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 22 00
UNIT PRICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

1.2 COSTS INCLUDED

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

1.3 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.
 - 1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at unit sum/priced contracted.
 - 2. When actual Work requires 25 percent or greater change in quantity than those quantities indicated, Owner or Contractor may claim for Contract Price adjustment.

1.4 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect/ Engineer.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Measurement Devices:
 - 1. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
 - 3. Metering Devices: Inspected, tested and certified by the applicable state department within the past year.
- E. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- F. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- G. Measurement by Area: Measured by square dimension using mean length and width or radius.
- H. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

- I. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect/ Engineer, multiplied by the unit price.
- B. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of item of the Work; overhead and profit.
- C. Payment will not be made for any of the following:
 1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from the transporting vehicle.
 4. Products placed beyond the lines and levels of the required Work.
 5. Products remaining on hand after completion of the Work.
 6. Loading, hauling, and disposing of rejected Products.

1.6 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not complying with specified requirements.
- B. If, in the opinion of Architect/ Engineer, it is not practical to remove and replace the Work, the Architect/ Engineer will direct one of the following remedies:
 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Architect/ Engineer and Owner.
 2. The defective Work will be partially repaired to the instructions of the Architect/ Engineer and Owner, and the unit price will be adjusted to a new unit price at the discretion of Architect/ Engineer and Owner.
- C. The individual specification sections may modify these options or may identify a specific formula or percentage price reduction.
- D. The authority of Architect/ Engineer to assess the defect and identify payment adjustment is final.

1.7 SCHEDULE OF UNIT PRICES

- Unit Price No. 1 : Remedial Floor Coating System.
Description: Addition or deletion of remedial floor coating system.
Unit of Measurement: Square Foot.
- Unit Price No. 2 : Asbestos Abatement of Pipe Fitting Insulation.
Description: Remove and dispose of asbestos containing pipe fitting insulation.
Unit of Measurement: Linear Foot, removed.
- Unit Price No. 3 : Asbestos Abatement of Pipe Insulation.
Description: Remove and dispose of asbestos containing pipe insulation.
Unit of Measurement: Each three foot section, removed.
- Unit Price No. 4 : Asbestos Abatement Floor Tile and Mastic.
Description: Remove and dispose of asbestos containing floor tile and mastic.
Price shall include all costs to provide removal in a single contained work space with containment enclosure currently in place.
Unit of Measurement: 10 Square Feet.
- Unit Price No. 5 : Asbestos Abatement Containment Area.
Description: Provide a single 10'-0" X10'-0" containment area at locations where additional asbestos abatement is to be performed.

- Unit of Measurement: Each enclosure.
Unit Price No.6 : Asbestos Abatement Decontamination System Enclosure.
Description: Cost to mobilize and construct a decontamination enclosure at the project site.
Unit of Measurement: Each mobilization and construction.
- Unit Price No. 7 : Asbestos Abatement Associated with Minor-Size Penetrations.
Description: Construction of Minor-Size Tent Enclosure and Spot Abatement (less than 10 SF) of Plaster Walls and Ceilings for Various Mechanical, Electrical, Plumbing, and Ancillary Work.
Unit of Measurement: Each Minor Tent and Minor-Size Abatement
- Unit Price No. 8 : Asbestos Abatement Associated with Small-Size Penetrations.
Description: Construction of Small-Size Regulated Work Area Enclosure, and Abatement of Small Size (greater than 10 SF, but less than 160 SF) Area of Plaster Walls and Ceilings for Various Mechanical, Electrical, Plumbing, and Ancillary Work
Unit of Measurement: Square foot of Abatement.
- Unit Price No. 9 : Asbestos Abatement Associated with Large-Size Penetrations.
Description: Construction of Large-Size Regulated Work Area Enclosure and Abatement of Large Size (greater than 160 SF, up to 500 SF) Area of Plaster Walls and Ceilings for Various Mechanical, Electrical, Plumbing, and Ancillary Work
Unit of Measurement: Square Foot of Abatement.
- Unit Price No. 10 : Granular Fill.
Description: Addition or deletion of compacted granular base. See relevant Specification Sections.
Unit of Measurement: Cubic yard.
- Unit Price No. 11 : Concrete Walks.
Description: Addition or deletion of new Concrete Sidewalk and subbase. See relevant Details and Specification Sections.
Unit of Measurement: Square Foot.
- Unit Price No. 12 : Provide a new 1 inch Valve.
Description: Provide a unit price add to the contract to provide a new 1 inch Valve as detailed and specified in the contract documents.
Unit of Measurement: Per valve Installed
- Unit Price No. 13 : Provide a new 1 1/4 inch Valve.
Description: Provide a unit price add to the contract to provide a new 1 1/4 inch Valve as detailed and specified in the contract documents.
Unit of Measurement: Per valve Installed
- Unit Price No. 14 : Provide a new 1 1/2 inch Valve.
Description: Provide a unit price add to the contract to provide a new 1 1/2 inch Valve as detailed and specified in the contract documents.
Unit of Measurement: Per valve Installed
- Unit Price No. 15 : Provide a new 2 inch Valve.
Description: Provide a unit price add to the contract to provide a new 2 inch Valve as detailed and specified in the contract documents.
Unit of Measurement: Per valve Installed
- Unit Price No. 16 : Provide a new 2 1/2 inch Valve.
Description: Provide a unit price add to the contract to provide a new 2 1/2 inch Valve as detailed and specified in the contract documents.
Unit of Measurement: Per valve Installed
- Unit Price No. 17 : Provide a new 3 inch Valve.
Description: Provide a unit price add to the contract to provide a new 3 inch Valve as detailed and specified in the contract documents.
Unit of Measurement: Per valve Installed
- Unit Price No. 18 : Provide a new 4 inch Valve.
Description: Provide a unit price add to the contract to provide a new 4 inch Valve as detailed and specified in the contract documents.

Unit of Measurement: Per valve Installed

Unit Price No. 19 : Additional Category 6 Data Drop - Established Pathway.

Description: Addition or deletion to provide to install a single data drop to a location with an established pathway. Price to include labor for any work shift.

Unit of Measurement: Per drop, not to exceed 295 feet.

Unit Price No. 20 : Additional Category 6 Data Drop - New Pathway.

Description: Add or deletion to provide a single data drop to a location without an established pathway. Price to include labor for any work shift.

Unit of Measurement: Pre drop, not to exceed 50 feet of conduit and surface raceway, cable not to exceed 295 feet.

Unit Price No. 21 : Additional Category 6A Data Drop - Established Pathway.

Description: Addition or deletion to provide to install a single data drop to a location with an established pathway. Price to include labor for any work shift.

Unit of Measurement: Per drop, not to exceed 295 feet.

Unit Price No. 22 : Additional Category 6A Data Drop - New Pathway.

Description: Add or deletion to provide a single data drop to a location without an established pathway. Price to include labor for any work shift.

Unit of Measurement: Pre drop, not to exceed 50 feet of conduit and surface raceway, cable not to exceed 295 feet.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Alternates.
- B. Procedures for pricing Alternates.

1.2 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to, or required for a complete installation whether or not mentioned as part of the Alternate.
 - 2. Include, as part of each alternate, all related construction coordination, modifications or adjustments.
- C. Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other Work of this Contract
- E. Schedule: A "Schedule of Alternates" is included at the end of this Section.
- F. The successful Bidder agrees to hold all Alternate Bids firm and unchanged for a period not to exceed 120 calendar days following the closing date for bidding.

1.3 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Provide all work for labor and material for the Pavilion (Section 13 34 23), and all associated details, specifications, utilities, electrical and sitework as indicated by the contract documents.
- B. Alternate No. 2: Provide all work for labor and material for the site lighting work as indicated by the contract documents.
- C. Alternate No. 3: Provide all work for labor and material for the File storage room, storage, and vault renovations in their entirety in Area A (First Floor) as indicated by the contract documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

- A. Section 00 21 14 - A701 - Instructions to Bidders: Restrictions on timing of substitutions
- B. Section 01 22 00 - Unit Prices, for additional unit price requirements.
- C. Section 01 23 00 - Alternates, for product alternatives affecting this section.
- D. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.
- E. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.
- F. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

1.3 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

1.4 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage); Current Edition.
- B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase); Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- E. Limit each request to a single proposed substitution item.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 - 1. Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.
- B. Submittal Form (before award of contract):
 - 1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
 - 1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request (After Bidding/Negotiating). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Architect will consider requests for substitutions only within 30 days after date of Agreement.

- C. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- D. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- E. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.

3.4 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 - 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.5 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Delegated Design
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Superintendent's meetings.
- F. Preinstallation meetings.
- G. Number of copies of submittals.
- H. Submittal procedures.
- I. Electronic submittal procedure.

1.2 RELATED REQUIREMENTS

- A. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.
- B. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Coordination Document: The HVAC/Mechanical, Plumbing and Electrical Trades Contractors shall execute a coordination document identifying primary utilities in shared spaces. Circulation of the coordination document will be in the order contract trades are listed above. Conflicts in utility coordination are to be brought to the attention of the Construction Manager. Copies of the final coordination document will be distributed to each trade.

- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements. Install utilities parallel with structure and as inconspicuous as possible in exposed spaces.
- F. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4 DELEGATED DESIGN

- A. All work requiring the services of a Delegated Design Professional shall be conducted by a Licensed Professional Engineer, licensed in the State of New York.
- B. All items submitted by the Delegated Design Professional shall be signed and sealed by the Licensed Professional Engineer. These submittals shall include, but are not limited to:
 - 1. Shop Drawings and details.
 - 2. Design calculations, including loading, stresses, and connections.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Construction Manager will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
 - 4. Construction Manager.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Construction Manager will record minutes and distribute copies two days after meeting to participants, with copies to participants, and those affected by decisions made.

3.2 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.

- B. Construction Manager will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
 - 6. Construction Manager.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.
- E. Construction Manager will record minutes and distribute copies within two days after meeting to participants, with copies to participants, and those affected by decisions made.

3.3 PREINSTALLATION MEETING

- A. When required in individual specification sections, convene preinstallation meeting at Project site prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Architect seven days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Construction manager will record minutes and distribute copies after meeting to participants, with copies to Architect, Owner, and those affected by decisions made.

3.4 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 - 1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.
 - 2. Coordinate with Contractor's construction schedule and schedule of values.
 - 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 - 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 - 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

- a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.5 COORDINATION MEETINGS

- A. The Construction Manager will conduct Project Coordination Meetings weekly or on an "as-needed" basis. Project Coordination Meetings are in addition to specific meetings held for other purposes, such as regular Project Meetings and special Pre-Installation Meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. The Construction Manager will record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

3.6 SUBMITTAL

- A. General:
 1. Transmit each submittal with form provided by Architect via Newforma Info Exchange.
 2. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
 3. Identify Project, Contractor, Subcontractor, or Supplier; pertinent drawing and detail number, and specification number, as appropriate on each copy.
 4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 5. Deliver submittals, containing samples, to Architect at Airport Corporate Park, 100 Hunt Center, Horseheads, NY 14845-1019. All other submittals to be submitted through Newforma Exchange as specified below.
 6. Schedule submittals to expedite the Project, and coordinate submission of related items.
 7. For each submittal for review, allow fifteen (15) days excluding delivery time to and from the Contractor.
 8. Identify variations from Contract Documents and Product or System limitations that may be detrimental to successful performance of the completed Work.
 9. When revised for resubmission, identify all changes made since previous submission.
 10. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
 11. Submittals not requested, or incomplete, will not be recognized or processed.
- B. Proposed Product List:
 1. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 2. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- C. Product Data: Submit to for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 1. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
 2. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 3. After review distribute in accordance with Submittal Procedures article above and provide copies for record documents described in Section 01 70 00.
- D. Shop Drawings: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 2. Do not reproduce the Contract Documents to create shop drawings.
 3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
 4. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 5. After review distribute in accordance with Submittal Procedures article above and provide copies for record documents described in Section 01 70 00.
- E. Samples: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
1. Samples For Selection as Specified in Product Sections:
 - a. Submit to Architect for aesthetic, color, or finish selection.
 - b. Submit samples of finishes from full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Architect's selection.
 2. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 3. Include identification on each sample, with full Project information.
 4. Submit number of samples specified in individual specification sections; Architect will retain one sample.
 5. Reviewed samples which may be used in the Work are indicated in individual specification sections.
 6. Samples will not be used for testing purposes unless specifically stated in specification section.
 7. After review distribute in accordance with Submittal Procedures article above and provide copies for record documents described in Section 01 70 00.
- F. Design Data
1. Submit for Architect's knowledge as contract administrator or for Owner.
 2. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- G. Test Reports
1. Submit for Architect's knowledge as contract administrator or for Owner.
 2. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- H. Certificates
1. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect, in quantities specified for Product Data.
 2. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 3. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.
- I. Manufacturer's Instructions
1. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing.
 2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- J. Manufacturer's Field Reports
1. Submit reports for Architect's benefit as contract administrator or for Owner.
 2. Submit report in duplicate within 30 days of observation for information.
 3. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

- K. Erection Drawings
 - 1. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

3.7 ELECTRONIC SUBMITTAL PROCEDURES - NEWFORMA

- A. Using the PDF cover sheet provided by the Architect, fill out the information required for the submittal. Each submittal must be provided with the submittal cover sheet.
- B. Combine PDF cover sheet with product submittal. Cover sheets are to precede the product submittal information.
- C. If shop drawings are over 11" x 17" in size, hard copies are to be provided.
- D. Electronic submittals shall be up-loaded to the Project Team through Newforma Info Exchange. Directions to access Newforma will be provided by the Architect.
- E. Notification will be automatically be generated by Newforma to the Project Team when a new submittal has been created.

3.8 ARCHITECT'S/ENGINEER'S SUBMITTAL ACTION

- A. Except for submittals for the record or information, where action and return is required, the Architect or his consultant will review each submittal, mark to indicate action taken, and return.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. Final Unrestricted Release: When the Architect marks a submittal "Reviewed" the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Architect marks a submittal "Reviewed as Noted," 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 payment depends on that compliance.
 - 3. Returned for Re-submittal: When the Architect marks a submittal " Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - a. Do not use, or allow others to use, submittals marked " Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
 - 4. Rejected: When the Architect marks a submittal "Rejected," do not proceed with any Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Prepare a new submittal conforming to the product characteristics specified by the contract documents; resubmit without delay. Repeat if necessary to obtain different action mark.
 - 5. Submit Specified Item: When submittal is marked "Submit Specified Item", the Contractor shall immediately resubmit the specified item.
- C. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned marked "Action Not Required".

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS

- A. Section 01 10 00 - Summary: Work sequence.

1.3 SUBMITTALS

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule .
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Submit updated schedule with each Application for Payment.
- D. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

1.4 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Scale and Spacing: To allow for notations and revisions.

PART 2 SCHEDULE

2.1 GENERAL

- A. A milestone/ phasing construction schedule including start and completion dates and layout in zones with key dates, has been prepared. The milestone schedule has been included as part of the bidding documents within this section.
- B. All Work will be conducted in a "single" phase to provide the least possible interference to the activities of the Owner's personnel and to permit the facilities to be partially utilized during implementation of the work.
 - 1. The Contractor is expressly forewarned that impacts to the construction schedule during any phase or portion of the project will not be permitted.
 - 2. Award: August 2024
 - 3. Preconstruction/Submittals: August/Sept. 2024
 - 4. Mobilize: August 2024
 - 5. Construction Area 1: 8/19/24 to 12/23/24
 - a. Fitness Center & Associated Areas: 8/19//24 to 12/23/24
 - 6. Construction Area 2: 12/24/24 to 6/22/25
 - a. File Storage Area: 12/24/24to 3/31/25
 - b. Music Rooms: 4/1/25 to 6/22/25

7. Construction Area 3: 6/23/25 to 9/2/25
 - a. Area C & D Classrooms: 6/23/25 to 9/2/25
 - b. Art Room Classroom: 6/23/25 to 9/2/25
 - c. Cafeteria/Kitchen: 6/23/25 to 9/2/25
 8. Substantial Completion: September 2, 2025.
- C. Schedule of Completion: All work of this project shall be substantially completed by the date indicated on the milestone/ phasing schedule, unless noted otherwise.
 - D. All schedules and calendars shall be used as tools in developing the project schedule.
 - E. Upon Notice to Proceed the overall Project CPM Schedule will be prepared by the **General Trades Contractor** as outlined in this section.
 - F. Start and end dates must be met.

PART 3 EXECUTION

3.1 GENERAL

- A. The CPM Schedule network plan including any appropriate milestone dates and the computer produced reports shall be part of the Owner/Contractor agreement as stipulated herein.
- B. All Prime Contractors shall provide all information required by the Construction Manager to the General Contractor for development of a network plan and schedule for this in accordance with the requirements of this section of the General Requirements.
- C. The purpose of the plan and schedule will be to assure adequate planning, coordination and execution of the work of the various Prime Contractors, and to assist the Construction Manager in monitoring the progress of the work and evaluating proposed changes to the contract and schedule.
- D. The project management tool commonly called the Critical Path Method (CPM) will be employed for the planning, scheduling and report of all work to be performed under the contract. The precedence diagramming method shall be utilized in preparing the CPM Schedule network diagrams.
- E. There are other contracts and work which will run concurrently with this Contract, and may run subsequently to the work of this Contract. The project network diagram and schedule will reflect the major interfaces between the work of this Contract and the concurrent and succeeding work of the other contracts.
- F. The Construction Manager may modify the network diagram to provide interface points for other contracts for this Project.
- G. Activity time delays shall not automatically mean that an extension of the Contract Completion Date is warranted or due the Contractor. A Contract Modification or delay may not affect existing critical activities or cause noncritical activities to become critical. A Contract Modification or delay may result in only absorbing part of the available total float that may exist within an activity chain on the Network, thereby not causing any effect of any interim milestone date or the Contract Completion Date.
- H. Total float is defined as the amount of time between the early start date and late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float is for the exclusive use or benefit of the Owner. Extensions of time to milestone dates for the Contract Completion Date under the Contract will be granted only to the extent that is equitable time adjustments to the activity or activities affected by the Contract Modification or delay

exceeds the total float of the affected or subsequent paths and extends any interim milestone date or the Contract Completion Date.

3.2 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.
- B. To the extent necessary for the General Trades Contractor to reflect in a computerized CPM Schedule network diagram each Prime Contractor's proposed plan for completion of their work, all Prime Contractors shall be prepared to meet with and assist the General Contractor, and furnish information subsequent to award of the contract.
- C. Within (3) calendar days following the Contract Issuance, the Construction Manager will meet with the Prime Contractors and conduct a review of the Prebid Milestone/phasing to assure their understanding of said project schedule requirements and contractual milestone dates.
- D. Within four (4) calendar days after the meeting to review the Milestone/Phasing Schedule, all Prime Contractors will provide their proposed plans of operation to the General Contractor. The Contractor's plan of operations shall consist of, but not limited to, the following:
 1. List of proposed Construction Activities.
 2. List of proposed Durations of Construction Activities (in workdays).
 3. List of Dependency Relationships of Construction Activities.
 4. List of proposed Durations for major procurement items (in workdays).
 5. Proposed Sequencing of Construction Activities.
- E. The Construction Manager, the General Trades Contractor and each Prime Contractor will meet and jointly review the CPM project schedule, based on the General Contractor's proposed plan and sequences of operation. Any areas of such plans which, in the opinion of the Construction Manager, will conflict with timely completion of the project will be subject to revision by the General Contractor unless adequate justification for these plans, durations and logic (as determined by Construction Manager) is provided by the Prime Contractor within (10) calendar days of the Construction Manager's notice to the Prime Contractor of the Construction Manager's intent to revise the schedule. At these meetings, the General Contractor and the Prime Contractors, with the aid of the Construction Manager, will manually construct a precedence diagram describing the activities to be accomplished, their dependency relationships and their durations. The General Contractor will then, using the manual precedence diagram, prepare a computer produced schedule showing starting and completion dates for each activity.
- F. In preparing the manual precedence diagram, each Prime Contractor will be responsible for assuring that any/all subcontractor work, as well as their own work, is included and that the diagram shows a coordinated plan of work.
- G. The manually prepared precedence diagram, when fully developed, will show the sequence and interdependence of activities required for complete performance of all the work under all of the Prime Contracts. In developing the precedence diagram, the work will be divided into activities with a maximum duration of twenty (20) working days each, unless otherwise directed by the Construction Manager, except for non-construction activities such as procurement of materials, delivery of equipment, and concrete curing.
- H. Proposed durations assigned to each activity shall reflect each Prime Contractor's best estimate of time required to complete activity considering the scope and resources planned for activity.
- I. Failure by the General Contractor, and of the Prime Contractors or Construction Manager to include the element of work required for performance of the contract shall not excuse the Prime Contractors from completing all their work within the Contract Completion Date. If the Construction Manager questions any of the Prime Contractor's proposed durations, the Prime Contractor shall within ten (10) calendar days provide estimates of their labor and intended

crew and/or equipment sizes required for the activity which support the proposed duration to the satisfaction of the Construction Manager.

- J. Seasonal weather conditions will be considered in the planning and scheduling of all work influenced by high or low ambient temperatures to insure the completion of all contract work within the allotted contract time milestone completion dates.

3.3 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- G. Provide legend for symbols and abbreviations used.

3.4 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.5 REVIEW AND EVALUATION OF SCHEDULE

- A. Within seven (7) calendar days after receipt of the computer produced CPM Schedule and reports provided by the General Contractor, each Prime Contractor shall meet with the Construction Manager, if required, for joint review, correction, or adjustment of the proposed plan and schedule; After these joint meetings, the computer produced CPM Schedule and report will be revised in accordance with agreements reached during the joint reviews. Final review and acceptance by the Owner will take place after all Prime Contractors have approved the revised CPM Schedule.
- B. Upon establishment of an agreed upon schedule, each Prime Contractor will sign the CPM Schedule network drawings and computer produced reports, which will then indicate the acceptance and approval of the project schedule, sequence of activities and times for completion. Acceptance of the approved project schedule by all Prime Contractors and the Construction Manager will be a condition precedent to the making of any partial payments under the Contract.
- C. Participate in joint review and evaluation of schedule with Architect at each submittal.
- D. Evaluate project status to determine work behind schedule and work ahead of schedule.
- E. After review, revise as necessary as result of review, and resubmit within 10 days.

3.6 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. The Approved Project Schedule will be updated by the General Contractor and reviewed by the Construction Manager on a monthly basis for the purpose of recording and monitoring the progress of work. The Prime Contractors shall meet with the Construction Manager each month to review actual progress made to date, dates of activities started and completed, and the percentage of work completed to date on each activity started but not completed.
- H. Upon completion of the joint reviews, the General Contractor will revise the network to reflect progress to date plus any approved revisions to the network, and carry out a computer calculation to determine status which will be provided to each Prime Contractor.
- I. Based on the result of the monthly progress update, when the schedule no longer represents the actual prosecution and progress of the work, a revision to the schedule logic sequence and the precedence diagram may be required by the Construction Manager or requested by the Prime Contractors.
- J. A Prime Contractor may also request revisions to the logic sequence and precedence diagram in the event their planning for the project is revised. If a Prime Contractor desires to make changes in the Approved Project Schedule to reflect revisions in their method of operating and scheduling, they shall notify the Construction Manager in writing stating the reasons for the proposed revision.
- K. If a revision to the schedule logic sequence is contemplated, a Prime Contractor or the Construction Manager shall so advise the other in writing at least two (2) weeks prior to the next Schedule Update meeting, describing the revision and setting forth the reasons therefore.
- L. All reasonable requests by the Prime Contractors for revisions will be implemented by the Construction Manager if not reasonably objected to by any of the other Prime Contractors.
- M. Construction Manager directed revisions to the schedule will not be implemented without written notice to the Prime Contractors, who shall respond within ten (10) days, either agreeing with the Construction Manager's proposed revision or setting forth justification why it should not be accomplished. If the Prime Contractor's justification for not accomplishing the change is reasonable, such change will not be implemented.
- N. Updating the schedule to reflect actual progress made up to the date of an update shall not be considered revisions to logic sequence and schedule; in case of disagreements concerning actual progress to date, the Construction Manager's determination shall govern.
- O. If a Prime Contractor does not record any exceptions to the published Project Schedule update within ten (10) calendar days of its receipt, they will be deemed to have accepted and approved it.

3.7 RESPONSIBILITY FOR COMPLETION

- A. Each Prime Contractor shall furnish sufficient forces, plant and equipment, and shall work such hours including night shift and overtime operations, as necessary to ensure the prosecution of the work in accordance with the current monthly update of the Project Schedule. If, in the opinion of the Construction Manager, a Prime Contractor falls behind in meeting the schedule as presented in the current monthly update, the Contractor shall take such steps as may be necessary to improve their progress, and the Construction Manager may require them to increase the hours of work, the number of shifts, overtime operations and/or the amount of

construction plant and equipment without additional cost to the Owner or Construction Manager. All additional expenses incurred by the Owner, Construction Manager and Architect/Engineer due to such work will be deducted from the amount due the Prime Contractor. The provisions of this section shall not be construed as prohibiting work on Saturdays, Sundays and holidays if the Prime Contractor so elects and if approved by the Construction Manager.

- B. Failure of a Prime Contractor to comply with the requirements of this subsection shall be a basis for determination by the Owner that the Prime Contractor is not prosecuting the work with such diligence as will ensure completion within the time stipulated. Upon such determination, the Owner may terminate the Prime Contractor's right to proceed with the work or any separable part thereof, in accordance with the provisions of the General Conditions, or may take such other actions as may be deemed appropriate.
- C. It shall be the responsibility of all Prime Contractors to maintain their progress so as not to delay the progress of the project or the progress of other Prime Contractors. If a Prime Contractor delays the progress of the project or the progress of other Prime Contractors, it shall be the responsibility of Prime Contractor causing the delay to increase the number of shifts, days of work, and/or to the extent permitted by law, to institute or increase overtime operations all without additional cost to the Owner to regain the time lost and to maintain the over schedule. Each Prime Contractor is required by virtue of this Contract to cooperate in every way possible with all other Prime Contractors in order to maintain the scheduled completion date. No additional compensation will be considered for such cooperation.

3.8 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 33 29.07
PROHIBITED CONTENT INSTALLER CERTIFICATION

PROJECT NAME: CAPITAL IMPROVEMENTS PROJECT PHASE 2; NO.: 3288-008.

USE OF THIS FORM

- 1.1 BECAUSE INSTALLERS ARE ALLOWED AND DIRECTED TO CHOOSE ACCESSORY MATERIALS SUITABLE FOR THE APPLICABLE INSTALLATION, THERE IS A POSSIBILITY THAT SUCH ACCESSORY MATERIALS MIGHT CONTAIN VOC CONTENT IN EXCESS OF THAT PERMITTED, ESPECIALLY WHERE SUCH MATERIALS HAVE NOT BEEN EXPLICITLY SPECIFIED.
- 1.2 CONTRACTOR IS REQUIRED TO OBTAIN AND SUBMIT THIS FORM FROM EACH INSTALLER OF WORK ON THIS PROJECT.
- 1.3 FOR EACH PRODUCT CATEGORY LISTED, CIRCLE THE CORRECT WORDS IN BRACKETS: EITHER [HAS] OR [HAS NOT].
- 1.4 IF ANY OF THESE ACCESSORY MATERIALS HAS BEEN USED, ATTACH TO THIS FORM PRODUCT DATA AND SDS SHEET FOR EACH SUCH PRODUCT.
- 1.5 VOC CONTENT RESTRICTIONS ARE SPECIFIED IN SECTION 01 61 16.

PRODUCT CERTIFICATION

- 2.1 I CERTIFY THAT THE INSTALLATION WORK OF MY FIRM ON THIS PROJECT:
 - A. [HAS] [HAS NOT] required the use of ADHESIVES.
 - B. [HAS] [HAS NOT] required the use of JOINT SEALANTS.
 - C. [HAS] [HAS NOT] required the use of PAINTS OR COATINGS.
 - D. [HAS] [HAS NOT] required the use of COMPOSITE WOOD or AGRIFIBER PRODUCTS.

2.2 ___ LIST OF PRODUCTS OF THESE TYPES THAT WERE USED IS ATTACHED, WITH MANUFACTURER AND BRAND NAME.

2.3 ___ PRODUCT DATA AND SDS SHEETS FOR THESE PRODUCTS:

- A. ___ Are attached.
- B. ___ Were submitted as normal submittals.
- C. ___ Were submitted as sustainable design submittals using the Material Content Form.

CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)

3.1 FIRM NAME: _____

3.2 PRINT NAME: _____

3.3 SIGNATURE: _____

3.4 TITLE: _____ (OFFICER OF COMPANY)

3.5 DATE: _____

END OF SECTION

SECTION 01 35 17
ALTERATION PROJECT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Requirements for protection of existing facilities.
- B. Demolition and removals.
- C. Cutting and Patching Requirements
- D. Hazardous materials procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements.
- B. Section 01 50 00 - Temporary Facilities and Controls.
- C. Section 07 84 00 - Firestopping.

1.3 SUBMITTALS

- A. Comply with requirements of Section 01 30 00 as modified below:
 - 1. Submit Samples of all materials used in patch to match work, specifically ceramic tile, quarry tile, terrazzo, grout, glazed block, ground face block, brick, faux finishes, fabrics, vct, carpet, stained finishes, and any other material deemed necessary by the Architect to ensure appropriate matching of existing finishes.
 - 2. Submit written explanation of "cutting and patching" procedures when construction means and methods deviate from standard industry practices. At a minimum provide the following:
 - a. Describe extent of cutting and patching, and methods to be used.
 - b. Products to be used.
 - c. Utilities that will be affected.
 - d. Details and Engineering calculations when structural members will be affected either by adding reinforcement or altering the structural member.

1.4 DEFINITIONS

- A. "Cutting and Patching" – The process of "opening up", or "exposing" new or existing construction to facilitate the coordination of work, the installation of new work, the testing or inspection of work or building components, and the subsequent "closing up" or "restoration" of affected area back to it's original condition.
 - 1. Cutting: Physical modification of construction work, both new and existing, or removal of existing or installed materials necessary to permit installation or performance of other work, including but not limited to; cutting, drilling, core-drilling, chopping, excavating, saw-cutting, trenching, backfill and compaction and other similar operations.
 - 2. Patching: Restoration, replacement and installation of construction material, new and existing, required to restore surfaces to original conditions and maintain fire rated assemblies after installation of other work.

1.5 PROTECTION OF EXISTING FACILITIES

- A. Responsibilities of Each Prime Contractor

1. Provide and maintain protective measures required to prevent damage to existing facilities and to protect workmen and public, including protective construction required by applicable state and municipal laws, OSHA regulations, Contract Documents, site conditions, and as considered normal for operations involved in the work.
 - a. Construct protective measures of types and materials that provide required protection continuously.
 - b. Remove protective measure only when need for protection no longer exists.
 - c. Provide additional protection as directed by Construction Manager.
 2. Roof Protection: During operations on existing or newly-constructed roofs, provide protection for roof in work area in adjacent roof areas.
 - a. Where construction operations on roof require removal of existing roofing system, apply roof protection to roof areas adjacent to work area and to approved access routes to work area.
 - b. Where construction operations on roof do not require removal of existing roofing system, apply roof protection to all roof areas in work area and to approved access routes to work area.
 - c. Limit traffic on roof to protected areas.
 - d. Strictly comply with roof protection recommendations of agency, or agencies, holding bond, guarantee, or warranty in force for existing roof; however, if such recommendations are not available, provide minimum protection as follows:
 - 1) Minimum 1 layer of 1/2" exterior grade plywood laid over existing roof with 1 layer of 1/8" asphalt saturated protection board on top of plywood.
 - 2) On loose-laid elastic sheet roofing systems with stone ballast, remove existing ballast from area to receive protection, and apply minimum 6 mil. thick polyethylene sheeting over exposed membrane before laying plywood, unless otherwise recommended by roofing system manufacturer.
 - e. Where roofing is cut to permit new construction, provide temporary roofing, temporary curbs, temporary coverings, and similar measures to prevent entrance of water. Refer to Section 01 50 00 - Temporary Facilities and Controls. Remove minimum amount of existing roofing and insulation required to accomplish new construction.
- B. Damage to Existing Construction
1. Each Prime Contractor shall be responsible for damage to existing and newly installed construction caused by his, or his subcontractor's personnel and he shall repair, replace, or restore damaged construction immediately without additional cost to Owner.
 - a. If Prime Contractor fails to immediately make efforts to repair, replace, or restore damaged construction, Owner may, after due notice, accomplish required repair, restoration, or replacement in accordance with provisions in General Conditions.
 - b. Reimburse any other Prime Contractor for additional cost resulting from failures described above.
 - c. The Owner will make no additional payment to the Contractor for additional work resulting from failures described above.
 - d. When damage to existing facilities occur and Contractors do not admit to damage the Construction Manager will research to find responsible party. If party cannot be determined all trades will share the cost of appropriate repairs to return the damaged area to original condition.
 2. Provide work required to repair, reconstruct, or replace existing construction due to failure of protective measures provided or due to failure of Prime Contractor to provide adequate protective measures.
 - a. Coordinate all repair, replacement, or restoration activities through the Construction Manager.
 - b. Patch damaged surfaces and refinish to match existing surfaces as required or as directed by Construction Manager.

1.6 DEMOLITION AND REMOVALS

- A. Responsibility for Demolition and Removals
 - 1. Each Prime Contractor shall provide cutting and patching of existing surfaces disturbed by the work of their contract unless noted to be provided by another contract.
 - 2. Each Prime Contractor shall make provisions for removal, demolition, or disconnection of existing construction, equipment, and similar items as required for completion of his contract as shown in the Contract Documents, or encountered during the Project.
 - a. Coordinate requirements for removal, disconnection, or demolition with other Prime Contractors.
 - b. Remove all related items not shown or specified as required to complete removals shown on Drawings, including but not limited to insulation, hangers, supporting construction, and similar items. Consult Architect for instructions when such removals involve removal or cutting of structural components.
 - 3. Equipment removal:
 - a. Owner shall remove furniture and small loose equipment, unless otherwise specified. Review removals with Owner prior to beginning demolition and removals.
 - b. Prime Contractor requiring work shall remove, relocate, and reinstall existing equipment, built-in cabinets, casework, and similar items, including disconnection and capping of utility connections at existing location unless noted to be provided by others.
 - 1) Connection of utilities at new locations shall be by trade that would normally have installed the item.
 - 2) Comply with requirements for "Disposal of Removed Materials" below for equipment designated to be turned over to Owner.
 - c. All existing fixtures and equipment, regardless of their nature, scheduled for removal and reinstallation in current or new location, shall be thoroughly cleaned to the condition expected in a normal, commercial building cleaning and maintenance program, including incidental construction dust during storage, immediately prior to reinstallation. Such reinstalled fixtures and equipment shall further be subject to Final Cleaning Procedures outlined in other specification sections, prior to Substantial Completion.
- B. Verification of Conditions: Each Prime Contractor shall be responsible for visiting the site and building, studying the Drawings, making his own determination as to items and quantities of demolition and removal required, and including required demolition and removals in his bid.
 - 1. Additional payment will not be made on claims resulting from incomplete estimate of demolition or removals by Prime Contractor.
 - 2. Any definition of scope of demolition and removals within Contract Documents is intended to establish general limits and responsibilities for demolition and removal work.
 - a. Where details in Construction Documents indicate a typical situation requiring demolition or removals, consider such situation to apply to similar conditions throughout and make required demolition or removals.
 - b. Verify exact locations of existing piping shown on Drawings.
 - c. Check load bearing function of walls and partitions before starting removal.
- C. Concealed Conditions
 - 1. Where structural items, piping, conduit, or other items are exposed during demolition whose function is unknown, notify Architect and await instructions before proceeding with removal.
 - 2. Where exact locations of existing piping differs from locations shown on drawings, modify indicated connections, relocations, and deletions as required by project conditions, including necessary extensions with new piping to nearest approved point of connection.
- D. Safety: Carefully perform demolition and removals in such manner to insure safety in handling and to prevent damage to construction and materials indicated to remain.

1. Provide shoring, bracing, and other temporary measures as required to maintain safe conditions, including structural safety of building.
 2. Provide rigging, hoists, cutting equipment, and similar items required for demolition and removals.
- E. Removal of existing ceilings: where existing ceiling finish is scheduled for removal, include existing suspension system in suspended ceiling systems, existing gypsum backer boards in adhesive-applied acoustical tile installation, and other ceiling system components as applicable.
- F. Disposal of removed materials
1. Materials, fixtures, and equipment requested by Owner while still in place, or before removal from site, shall be left on site in location designated by Owner. Itemize in memorandum of transmittal, and obtain receipt from Construction Manager for all such items.
 2. Carefully remove and store in protected locked location items noted in contract documents and items designated to be turned over to Owner until they can be relocated and reinstalled.
 - a. Where storage in protected, locked location is not possible, provide proper protection against weather and damage by suitable temporary enclosures.
 - b. Items damaged or lost during removal or storage shall be replaced in kind and quantity, at expense of responsible prime contractor.
 3. Materials, fixtures, and equipment not designated to be reinstalled, relocated, or turned over to Owner and all waste materials and debris shall be promptly removed to dumpsters and legally disposed of.
 - a. Materials or fixtures suitable for re-use may be used in temporary structured or partitions only.
 - b. No removed materials, fixtures, or equipment items shall be reused in permanent structure, unless specified in contract documents.

1.7 CUTTING AND PATCHING

- A. Unless otherwise noted, each Contractor shall be responsible for all cutting and patching, required in conjunction with the work of their contract and to:
1. Be familiar with all the Contract Documents, including other trades, to determine the extent of the cutting and patching requirements to be performed.
 2. Ensure all components fit properly.
 3. Remove out of sequence work installed prematurely.
 4. Remove and correct defective work and work not conforming to requirements of Contract Documents.
- B. Coordination:
1. Coordinate the installation of work with the work of other Contractors to minimize cutting and patching.
- C. In addition to contract requirements, upon written instructions of the Architect/Engineer:
1. All new work must be inspected prior to enclosing. If inspection has not been conducted, Contractor shall uncover newly installed work to provide for Architect/Engineer's observation.
- D. All Contractors shall bear the responsibility not to cut or otherwise alter the Owner's property or any separate Contractors' work except with the written consent of the Owner and of such separate Contractor. The Contractor shall not unreasonably withhold from the Owner or any separate Contractor, consent to cutting or otherwise altering the work.
- E. Provide equipment, labor, materials, and incidentals necessary for cutting and patching as required for the installation of new work.
- F. Prior to Cutting:

1. Provide shoring, bracing and support as required to maintain structural integrity of project. Contractor shall pay all cost of engineering associated with design of shoring system.
 2. Provide protection for materials on adjacent surfaces.
 3. Provide protection when work will be exposed to the elements.
 4. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operation. Each Prime Contractor is responsible to cover and protect furniture, equipment, etc. not being used in rooms where furniture and equipment will remain during Contractors working hours.
- G. Take all precautions necessary to avoid cutting existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.
- H. Cut back around removals to point where removal can be concealed with construction matching existing adjacent surfaces.
- I. Trim edges of cuts neatly and properly where cuts are to be left exposed or where replacement work is to be installed.
- J. Cap, plug, or otherwise seal disconnected items, openings, or devices.
- K. Each prime contractor is responsible for all expenses related to “cutting and patching” procedures required to complete the work of their contract.
- L. Do not cut and patch structural elements in a manner that would change their load bearing capacity or load - deflection ratio without first receiving approval from the Architect.
1. Specific items include:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Timber and primary wood framing.
 - g. Structural decking.
 - h. Stair systems.
 - i. Miscellaneous structural metals.
 - j. Exterior curtain-wall construction.
 - k. Equipment supports.
 - l. Piping, ductwork, vessels, and equipment.
 - m. Structural systems of special construction.
- M. Do not cut and patch operating elements or related components that would result in reducing their capacity to perform as intended or increase maintenance or decrease operational life or safety.
1. Specific items include:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.

- N. Do not cut and patch construction that would, in the Architects opinion reduce the buildings aesthetic qualities.
- O. Unless otherwise specified, provide patching materials to match adjacent materials in type, construction, installation, and detailing.
 - 1. Plaster: do not use plaster patching compounds containing asbestos.
 - 2. Ceramic tile/structural glazed tile: match existing color and pattern of existing tile units.
 - 3. Resilient floor tile: match thickness, color, and composition of existing tile units.
- P. Provide cutting and patching operations to ensure new work is flush with existing adjacent surfaces and terminations.
- Q. When finished surfaces are cut so that smooth transition with new work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.
- R. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition; to Architect/Engineer for review.
- S. Prepare substrates to receive new finish as required for proper application of new finish in accordance with new finish manufacturer's recommendations for existing conditions, including patching holes, leveling uneven surfaces, and similar work. Remove existing finishes where new wall, floor, or ceiling finishes are indicated.
- T. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective work and work not conforming to requirements of Contract Documents.
 - 4. Provide equipment, labor, materials and incidentals necessary for cutting and patching as required for the installation of new work.
 - 5. Remove samples of installed Work for testing.
 - 6. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- U. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

1.8 EXECUTION

- A. Plaster - patch existing plaster surfaces as follows:
 - 1. Missing plaster or plaster damaged to extent removal is required:
 - a. Areas 20 sq. in. or less: apply plaster directly to substrate.
 - b. Areas more than 20 sq. in.: use metal lath and plaster system over substrate.
 - 2. Cracked plaster not requiring removal: clean / remove any loose plaster, apply new plaster directly over crack with fiber mesh tape. Complete finish to extend a minimum 6 inches on both sides of crack and minimum 6 inches beyond both ends of crack. match existing texture.
- B. Ceramic tile: match patterns and installation methods of existing tile.
- C. Ceilings: review revised ceiling patterns with Architect in field prior to removal of existing ceiling.
- D. Resilient flooring: clean mastic, dirt, and similar contaminants from substrate after removal of existing resilient flooring, and prepare substrate in accordance with recommendations of new flooring manufacturer.
 - 1. Where patching of existing resilient flooring constitutes more than 50 percent of existing floor surface in room, replace entire floor.

- E. Hard surface floor: remove hard surfaces to required depth for installation of new finish materials, and prepare substrate as recommended by new finish material manufacturer, including acid etch or similar method.
- F. Painting
 - 1. Where alteration work involves 1 or 2 walls in room or area, paint entire surface of only the walls involved in alteration.
 - 2. Where alteration work involves more than 2 walls in room or area, paint all walls in room or area, unless otherwise indicated.

1.9 QUALITY ASSURANCE

- A. General: Structural and other conditions shall be verified with the Architect before proceeding with cutting, demolition and alterations work. Inspect structures prior to start of Work and notify the Architect in writing of any conditions detrimental to the execution of the Work.
- B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
- C. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
- E. Costs caused by out of sequence work prematurely installed, defective work, or work not conforming to the Contract Documents, including costs for additional services of the Architect/Engineer, will be paid for by the party responsible for out of sequence, rejected or non-conforming work.
- F. Miscellaneous Elements: Do not cut and patch the following elements or related 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.
 - 1. Water, moisture, or vapor barriers.
 - 2. Membrane and flashings.
 - 3. Exterior curtain-wall construction.
 - 4. Equipment supports.
 - 5. Piping, ductwork, vessels, and equipment.
 - 6. Noise and vibration-control elements and systems.
- G. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.
- H. Cut masonry and concrete materials using masonry saw or core drill.
- I. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- K. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00 - Firestopping, to full thickness of penetrated element.

1.10 HAZARDOUS MATERIALS PROCEDURES

- A. Hazardous materials: Each prime contractor is advised that if materials suspected to be lead, pcb, or to contain asbestos are encountered during construction, they shall immediately notify Owner and take precautions as required to avoid disturbing materials until directed by Owner.

PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 PERFORMANCE

- A. Remove and store in protected location, material, which is to be reused and relocated.
- B. Cutting shall be done in a manner that will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance.
- C. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
- D. Restore work, which has been cut or removed. Provide new products to complete work in accordance with requirements of Contract Documents.
- E. Refinish entire surfaces as necessary to provide an even finish:
 - 1. Continuous Surfaces: to nearest intersections.
 - 2. Assembly: entire refinishing.
- F. Fill and patch openings and holes in existing construction when bolts, piping, ducts, conduit and other penetrating items are removed.
- G. Visual requirements: Do no cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.
- H. Fire resistive integrity: Where holes or gaps remain from removed elements, fill void using solid fire resistive materials full depth of structure; terminate below finishes to allow new finish to be installed (see patching). Maintain the fire resistive and structural integrity of the structures.
- I. Firestopping: All products used for through-penetration firestop systems shall be tested and meet all federal, state, and local codes.
- J. Cutting: Cut existing construction use methods least likely to damage elements to be retained or adjoining construction. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
 - 1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing surfaces, cut or drill from the exposed or finished side into concealed surfaces.

3. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.
- K. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removal of walls or partitions extends from one finished area to another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new.
 4. Patching around piping and penetrations: Provide firestopping at perimeter of penetrations for smoke-tight seal to maintain integrity of fire resistive and smoke barrier qualities.
 5. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.
 - a. If two walls or more of a room are patched and painted, prepare and repaint the entire room - all wall surfaces.
- L. Patch, repair, or rehang existing ceiling as necessary to provide an even plane surface of uniform appearance.

3.2 CLEANING

- A. Daily cleaning of alteration areas of the building shall be the responsibility of each Contractor.
- B. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely, paint, mortar, oils, putty, and items of similar nature. Thoroughly clean piping, conduit, and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.
- C. Dust generated by cutting and patching shall be controlled in a manner so as to prevent infiltration into occupied spaces. Contractor(s) responsible for dust infiltrating the existing duct systems shall bear the cost of cleaning these systems.
- D. Demolished Materials shall be removed from the project site at frequent intervals. Piles of demolished materials will not be allowed to accumulate.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. References and standards.
- B. Testing and inspection agencies and services.
- C. Control of installation.
- D. Mock-ups.
- E. Tolerances.
- F. Manufacturers' field services.
- G. Defect Assessment.
- H. Examination and Preparation

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.
- G. Definitions:
 - 1. General: Basic contract definitions are included in the Conditions of the Contract.
 - 2. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

3. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
 4. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
 5. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
 6. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
 7. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
 8. Product: The term "product" refers to materials, systems and equipment.
 9. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
 10. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - a. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.
 - b. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trade persons of the corresponding generic name.
 - c. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - 1) This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
 11. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
 12. "Replace": Used herein as a term contraction and unless specifically noted means "remove existing and provide new".
 13. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- H. Specification Format and Content Explanation:
1. Specification Format: These Specifications are organized into Divisions and Sections based on the CSI-04 -Division format and Master Format numbering system.
 2. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

- a. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text and may include “prescriptive”, “open generic-descriptive”, “compliance with standards”, “performance”, “proprietary” or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
 - b. Abbreviated Language: Language used in Specifications and other Contract Documents are abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated, as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 - c. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - 1) The words "shall be" are implied where a colon (:) is used within a sentence or phrase.
 - d. Overlapping and Conflicting Requirements: Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent is intended and will be enforced, unless specifically detailed language written into contract documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to the Architect for a decision before proceeding.
 - e. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended to be the minimum for the work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with the minimum (within specified tolerances), or may exceed that minimum (within reasonable limits). In complying with these requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of the requirements. Refer instances of uncertainty to the Architect for decisions before proceeding.
 - f. Specialists, Assignments: In certain instances, specification of text (requires or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the contractor has no choice or option. These requirements should not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; they are also not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party of entity involved in a specific unit of work is recognized as “expert” for the indicated construction process or operation. Nevertheless, the final responsibility for fulfillment of the entire set of requirements remains with the Contractor.
3. Conflict: If there be conflicting variance between the Drawings and the Specifications, the provisions of the Specifications shall control. In case of conflict on the drawings between larger and small scale details and plans, the larger scale plans and details shall control.
- I. Industry Standards:
 1. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
 2. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

3. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - a. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

1.4 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing and inspection.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.

- D. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- E. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- F. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
- G. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- H. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect 15 days in advance of required observations.
 - 1. Observer subject to approval of Architect.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.5 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

3.6 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.

3.7 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substrate.

- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01 41 00
SPECIAL INSPECTIONS AND STRUCTURAL TESTING

PART 1 GENERAL

1.1 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to special inspections are the following:
 - 1. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the 2020 Building Code of New York State.
 - a. Also in accordance with NYS Education Department Guideline for Special Inspections.

1.2 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements.

1.3 GENERAL REQUIREMENTS

- A. The program of Special Inspection and Structural Testing is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.
- B. This specification section is intended to inform the Contractor of the Owner's quality assurance program and the extent of the Contractor's responsibilities. This specification section is also intended to notify the Special Inspector, Testing Laboratory, and other Agents of the Special Inspector of their requirements and responsibilities.
- C. The Special Inspector shall be the individual in charge of the Special Inspection program. The Special Inspector shall supervise and Review the work of the Testing and Inspection Agents for each testing or Inspection task. The Special Inspector shall be a licensed engineer in the state where the inspection and testing work is to be performed.
- D. A Special Inspections and Structural Testing pre-construction meeting shall be held by the Special Inspector. The meeting shall include any Inspection and Testing Agents, the Contractor, any applicable subcontractors and the Structural Engineer. The purpose of the meeting shall be to identify the specifics of the Special Inspection program, including, but not limited to the following:
 - 1. Identify the Special Inspector and Testing Agents
 - 2. Review the specification section and Statement of Special Inspections
 - 3. Determine the distribution list for inspection reports
 - 4. Provide contact information
 - 5. Determine which party shall schedule inspections and testing

1.4 SCHEDULE OF INSPECTIONS AND TESTS

- A. Required inspections and tests are described in the attached Schedule of Special Inspections and in the individual Specification Sections for the items to be inspected or tested.

1.5 QUALIFICATIONS

- A. The Special Inspector shall be a licensed Professional Engineer or Structural Engineer who is approved by the Structural Engineer of Record (SER) and Code Enforcement Officer.
- B. The Special Inspector shall verify the qualifications of each Inspection and Testing Agent comply with Section 1704.2.1 - Special inspector qualifications, and shall provide

documentation of each Agent to the Code Enforcement Official, Owner and Structural Engineer.

- C. The Testing Laboratory shall maintain a full time licensed Professional Engineer or Structural Engineer on staff who shall certify all test reports. The Engineer shall be responsible for the training of the testing technicians and shall be in responsible charge of the field and laboratory testing operations.
- D. Special Inspections shall be performed by inspectors who are either licensed Professional Engineers (P.E.), Structural Engineers (S.E.), or Engineers-In-Training (EIT) with an education and background in structural engineering except as indicated below.
 - 1. Special Inspections of soils and foundations may be performed by inspectors with an education and background in geotechnical engineering in lieu of a background in structural engineering.
 - 2. Technicians performing sampling and testing of concrete shall be ACI certified Concrete Field Testing Technicians - Grade 1.
 - 3. Inspectors performing inspections of concrete work such as inspections of concrete placement, batching, reinforcing placement, curing and protection, may be ACI certified Concrete Construction Inspectors or ICBO certified Reinforced Concrete Special Inspector in lieu of being a licensed P.E., S.E., or EIT.
 - 4. Inspectors performing inspections of prestressed concrete work may be ICBO/BOCA/SBCCI certified Prestressed Concrete Special Inspector.
 - 5. Inspectors performing inspections of masonry may be ICBO certified Structural Masonry Special Inspector.
 - 6. Technicians performing visual inspection of welding shall be AWS Certified Welding Inspectors or ICBO certified Structural Steel and Welding Special Inspectors, technicians performing non-destructive testing such as ultrasonic testing, radiographic testing, magnetic particle testing, or dye-penetrant testing shall be certified as an ASNT-TC Level II or Level III technician.
 - 7. Inspectors performing inspections of spray fireproofing may be ICBO certified Spray-Applied Fireproofing Special Inspector.
 - 8. Technicians performing standard tests described by specific ASTM Standards shall have training in the performance of such tests and must be able to demonstrate either by oral or written examination competence for the test to be conducted. They shall be under the supervision of a licensed Professional Engineer and shall not be permitted to independently evaluate test results.

1.6 SUBMITTALS

- A. The Special Inspector and Inspection and Testing Agents shall submit to the SER and Code Enforcement Officer for review a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.
- B. The Special Inspector and Inspection and Testing Agents shall disclose any past or present business relationship or potential conflict of interest with the Contractor or any of the Subcontractors whose work will be inspected or tested.

1.7 PAYMENT

- A. The Owner shall engage and pay for the services of the Special Inspector, Agents of the Special Inspector, and Testing Laboratory.
- B. If any materials which require Special Inspections are fabricated in a plant which is not located within 100 miles of the project, the Contractor shall be responsible for the travel expenses of the Special Inspector or Inspection and Testing Agents.

- C. The Contractor shall be responsible for the cost of any retesting or re-inspection of work which fails to comply with the requirements of the Contract Documents.

1.8 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall cooperate with the Inspector and their Inspection and Testing Agents so that the Special Inspections and testing may be performed without hindrance.
- B. The Contractor shall review the Statement of Special Inspections and shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Special Inspector or Testing Laboratory at least 24 hours in advance of a required inspection or test. Un-inspected work that required inspection may be rejected solely on that basis.
- C. The Contractor shall provide adequate OSHA-compliant access for the Special Inspector and their Inspection and Testing Agents for them to perform their work. This includes access to pipe scaffolds, swing-stage scaffolds, and any other methods of accessing the work areas that the Contractor or its agents to perform the work of the Contract.
- D. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.
- E. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the Inspector and their Inspection and Testing Agents.
- F. The Special Inspection program shall in no way relieve the Contractor of their obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program. All work that is to be subjected to Special Inspections shall first be reviewed by the Contractor's quality control personnel.
- G. The Contractor shall acknowledge each item listed as a discrepancy by the Special Inspection program in writing to the Owner, Architect, Engineer and Construction Manager. The acknowledgement shall identify whether or not the discrepancy has been corrected, is in compliance with the contract documents, and is ready for re-inspection.
- H. The Contractor shall be solely responsible for construction site safety.

1.9 LIMITS ON AUTHORITY

- A. The Special Inspector or Inspection and Testing Agents may not release, revoke, alter, or expand on the requirements of the Contract Documents.
- B. The Special Inspector or Inspection and Testing Agents will not have control over the Contractor's means and methods of construction.
- C. The Special Inspector or Inspection and Testing Agents shall not be responsible for construction site safety.
- D. The Special Inspector or Inspection and Testing Agents has no authority to stop the work.

1.10 STATEMENT OF SPECIAL INSPECTIONS

- A. The Statement of Special Inspections will be prepared by the Structural Engineer of Record (SER). Refer to the attached forms.
- B. The Statement of Special Inspections shall be submitted with the application for Building Permit.

1.11 RECORDS AND REPORTS

- A. The Special Inspector and Inspection and Testing Agents shall notify the Contractor of their presence on the job site at the start of any required inspection or test.
- B. Reports shall be submitted to the Special Inspector within three days of the inspection or test. Hand written reports may be submitted if final typed copies are not available.
- C. The Special Inspector and Inspection and Testing Agents shall prepare detailed reports of each inspection or test and submit the reports to the Structural Engineer of Record within seven days of the inspection or test. . Reports shall include:
 - 1. Date of test or inspection
 - 2. Name of inspector or technician
 - 3. Location of specific areas tested or inspected
 - 4. Description of test or inspection and results
 - 5. Identification of discrepancies
 - 6. Indication that the Contractor was made aware of discrepancies
 - 7. Applicable ASTM standard
 - 8. Weather conditions
 - 9. Signature of the Special Inspector overseeing the testing
- D. The Special Inspector shall submit interim reports to the Code Enforcement Officer at the end of each week which include all inspections and test reports received that week. Copies shall be sent to the SER, Architect, and Contractor.
- E. Any discrepancies from the Contract Documents found during a Special Inspection shall be immediately reported to the Contractor. If the discrepancies are not corrected, the Special Inspector shall notify the SER and Code Enforcement Officer. Reports shall document all discrepancies identified and the corrective action taken.
- F. The Inspection and Testing Agents shall immediately notify the Special Inspector and the SER by telephone or fax of any test results which fail to comply with the requirements of the Contract Documents.
- G. At the completion of the work requiring Special Inspections, each Inspection and Testing Agents shall provide a statement to the Special Inspector that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed.

1.12 FINAL REPORT OF SPECIAL INSPECTIONS

- A. The Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the SER and Code Enforcement Officer prior to the issuance of a Certificate of Use and Occupancy. Refer to the attached forms.
- B. The Final Report of Special Inspections will certify that all required inspections have been performed and will itemize any discrepancies that were not corrected or resolved.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 ATTACHMENTS - SEE STATEMENT OF SPECIAL INSPECTION IMMEDIATELY FOLLOWING
THIS SECTION

END OF SECTION



STATEMENT OF SPECIAL INSPECTIONS AND TESTS
 As required by the 2020 Building Code of New York State (BCNYS)
NYS EDUCATION DEPARTMENT, Office of Facilities Planning
89 Washington Avenue, Room 1060 EBA, Albany, NY 12234

BCNYS § 1704.3 requires the project Design Professional to complete the Statement of Special Inspections and Tests. BCNYS § 1704.2.3 requires the applicant to submit the completed statement of special inspections and tests with the contract documents per BCNYS § 106.1 for issuance of a building permit. The following statement of special inspections represents the minimum inspections expected for fulfillment of contractual obligations.

Project Title:
 POCANTICO HILLS CSD - PHASE 2 RENOVATIONS

School District: POCANTICO HILLS CSD Building: AREA A AND AREA C

SED Project Number: 660802-04-0001-040, 660802-04-7007-001 Project Address: 599 BEDFORD ROAD, SLEEPY HOLLOW, NY 10591

Architect/Engineer:
 HUNT Engineers, Architects, Land Surveyors & Landscape Architect, D.P.C.

Name of Person Completing this Statement: NATHAN G. BINNS, PE Phone: (607) 358-1000 Date: 11/15/2023

Comments:

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)		CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A.	Structural Steel						
1.	Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM Specifications. AISC 360 Section A3.3, N2	1705.2.1	✓	
2.	Inspection of high-strength bolting.	X	X	AISC 360, Section N5.6	1705.2.1	✓	
3.	Material verification of structural steel.		X	Applicable ASTM Specification. AISC 360 A3.1, N2	1705.2.1	✓	
4.	Material verification of welding consumables.		X	Applicable AWS Specification. AISC 360 Section A3.5, N2	1705.2.1	✓	
5.	Inspections of welding of structural steel.	X	X	AWS D1.1 AISC 360 N5.4 & 5.5	1705.2.1	✓	
6.	Inspection of steel frame joint details at each connection.		X	AISC 360 N5.8	1705.2.1	✓	
7.	Inspection of Galvanized Structural Steel Main Members		X	AISC 360 N5.7	1705.2.1		
B.	Cold Formed Steel Deck						
1.	Material Verification of Deck		X	SDI QA/QC SEC 6	1705.2.2	✓	
2.	Inspection of Field Welding of Deck		X	SDI QA/QC SEC 6, AWS D1.3	1705.2.2	✓	
3.	Inspection of Mechanical Fasteners.		X	SDI QA/QC SEC 6	1705.2.2	✓	
4.	Inspection of location and installation compliance		X	SDI QA/QC SEC 6	1705.2.2	✓	

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)		CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
C.	Open Web Steel Joists & Joists Girders					✓	
1.	End Condition - Welding or Bolted.		X	SJI 100, SJI 200	1705.2.3	✓	
2.	Bridging - Horizontal or Diagonal.		X	SJI 100, SJI 200	1705.2.3	✓	
D.	Concrete Construction						
1.	Inspection of reinforcing steel, including prestressing tendons, and verify placement.		X	ACI 318:CH20, 25.2, 25.3, 26.6.1-26.6.3	1705.3 1908.4	✓	
2.	Inspection of reinforcing steel welding.	X	X	AWS D1.4; ACI 318: 26.6.4	1705.3 1705.3.1	✓	
3.	Inspection of anchors cast in concrete.		X	ACI 318 17.8.2; AISC 360 N5.7	1705.3 1705.2.1	✓	
4.	Inspection of post installed mechanical and adhesive anchors.	X	X	ACI 318 17.8.2.4 ACI 318 17.8.2	1705.3	✓	
5.	Verify use of required design mix.		X	ACI 318: CH19, 26.4.3, 26.4.4	1705.3 1904.1 1904.2 1908.2 1908.3	✓	
6.	Sampling fresh concrete; slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 26.5, 26.12	1705.3 1908.10	✓	
7.	Inspection of concrete placement and shotcrete placement for proper application techniques.	X		ACI 318: 26.5	1705.3 1908.6 1908.7 1908.8	✓	
8.	Inspection for maintenance of specific curing temperature and techniques.		X	ACI 318: 26.5.3-26.5.5	1705.3 1908.9	✓	
9.	Inspection of prestressed concrete.	X		ACI 318: 26.10	1705.3		
10.	Inspection of the erection of precast concrete members.		X	ACI 318: 26.9	1705.3		
11.	Verification of in-situ concrete strength prior to removal of shores and forms from beams and slabs, and prior to stressing of tendons.		X	ACI 318: 26.11.2	1705.3		
12.	Inspection of formwork for concrete member being formed.		X	ACI 318: 26.11.1.2 (b)	1705.3	✓	

Inspection Task		Frequency		BCNYS REFERENCE	CHECK IF REQUIRED	Reference Standard for Criteria	
		CONTINUOUS	PERIODIC			TMS 402	TMS 602
E.	Masonry Construction						
	B=	Level B inspection required for building Risk Categories I, II, & III			1705.4		TMS 402 TMS 602
	C=	Level C inspection required for building Risk Category IV			1705.4		TMS 402 TMS 602
1.		Verify compliance with the approved submittals.		B & C	1705.4		Art. 1.5
2.		Verify that the following are in compliance.					
	a.	Proportions of site-mixed mortar, grout, and prestressing grout for bonded tendons.		B & C	1705.4		Art 2.1, 2.6 A, 2.6 B, 2.6 C, 2.4 G.1.b
	b.	Grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.		B & C	1705.4	Sec. 6.1	Art. 2.4, 3.4
	c.	Placement of masonry units and construction of mortar joints.		B & C	1705.4		Art. 3.3 B
	d.	Location and placement of reinforcement, connectors, and prestressing tendons and anchorages.	C	B	1705.4	Sec. 6.1, 6.2.1, 6.2.6, 6.2.7	Art. 3.2 E, 3.4, 3.6 A
	e.	Grout space prior to grouting.	C	B	1705.4		Art. 3.2 D, 3.2 F
	f.	Placement of grout and prestressing grout for bonded tendons.	B & C		1705.4		Art. 3.5, 3.6 C
	g.	Size and location of structural elements.		B & C	1705.4		Art. 3.3 F
	h.	Type, size, and location of anchors including other details of anchorage of masonry to structural members, frames, or other construction.	C	B	1705.4	Sec. 1.2.1(e), 6.1.4.3, 6.2.1	
	i.	Welding of reinforcement.	B & C		1705.4	Sec. 8.1.6.7.2, 9.3.3.4(c), 11.3.3.4(b)	

Inspection Task			Frequency		BCNYS REFERENCE	CHECK IF REQUIRED	Reference Standard for Criteria	
			CONTINUOUS	PERIODIC			TMS 402/ACI 530/ASCE 5	TMS 602/ACI 530.1/ASCE 6
	j.	Preparation, construction, and protection of masonry during cold weather (below 40°F(4.4°C)) or hot weather (above 90°F (32.2°C)).		B & C	1705.4			Art. 1.8 C, 1.8 D
	k.	Prestressing technique Application and measurement or prestressing force.	B & C	B	1705.4			Art. 3.6 B
	l.	Placement of AAC masonry units and construction of thin mortar joints.	B & C	B	1705.4			Art. 3.3 B9, 3.3 F.1.b
	m.	Properties of thin-bed mortar for AAC masonry.	B & C	B	1705.4			Art. 2.1 C.1
3.		Observe preparation of grout specimens, mortar specimens, and/or prisms.	C	B	1705.4			Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)		CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
F.	Wood Construction						
1.	Fabrication process of prefabricated wood structural elements and assemblies.	X			1705.5 1704.2.5		
2.	High-load diaphragms designed in accordance with Section 2306.2.	X			1705.5.1 1704.2		
3.	Metal plate connected wood trusses spanning 60' or more	X			1705.5.2		
G.	Soils	X	X		1705.6	✓	
H.	Driven Deep Foundations	X			1705.7		
I.	Cast-in-Place Deep Foundations	X			1705.8		
J.	Helical Pile Foundations	X			1705.9		
K.	Fabricated Items	X			1705.10 1704.2.5		
L.	Sprayed Fire-Resistant Materials				1705.14 1705.14.2 1705.14.3 1705.14.4 1705.14.5 1705.14.6		
M.	Mastic and Intumescent Fire-Resistant Coatings			AWCI 12-B	1705.15		
N.	Exterior Insulation and Finish Systems (EIFS)				1705.16		
O.	Fire-Resistant Penetrations & Joints. Risk category III & IV				1705.17		
P.	Smoke Control				1705.18		
Q.	Special Inspections for Wind Resistance				1705.11 1704.2		
R.	Special Inspections for Seismic Resistance				1705.12 1704.2		
S.	Structural Testing for Seismic Resistance				1705.13 1704.2		
T.	In-Situ Load Tests				1708		
X.	Preconstruction Load Tests				1709		
Y.	Other -See spec 01 41 00						

Final Report of Special Inspections

Project: *POCANTICO HILLS CSD - PHASE 2 RENOVATIONS*

Location: *599 BEDFORD ROAD, SLEEPY HOLLOW, NY 10591*

Owner: *POCANTICO HILLS CSD*

Richard N. Calkins, Superintendent

Owner's Address: *599 Bedford Road, Sleepy Hollow, NY 10591*

Architect of Record: *HUNT Engineers, Architects, Land Surveyors & Landscape Architect, D.P.C.*

Jeff Robbins, AIA

Structural Engineer of Record: *HUNT Engineers, Architects, Land Surveyors & Landscape Architect, D.P.C.*

Nathan Binns, PE

To the best of my information, knowledge and belief, the Special Inspections required for this project, and itemized in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections.)

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Special Inspector

(Type or print name)

Signature

Date

Licensed Professional Seal

Final Report of Special Inspections

Agent's Final Report

Project: *POCANTICO HILLS CSD - PHASE 2 RENOVATIONS*

Agent:

Special Inspector:

To the best of my information, knowledge and belief, the Special Inspections or testing required for this project, and designated for this Agent in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections.)

Respectfully submitted,
Agent of the Special Inspector

(Type or print name)

Signature

Date

*Licensed Professional Seal or
Certification*

SECTION 01 41 13
CODES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building Code Standards

1.2 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: References and Standards.

1.3 SUMMARY OF BUILDING CODE STANDARDS

- A. The design of this project conforms to all applicable provisions of, and Work shall be performed in accordance with the following:
 - 1. The New York State Uniform Fire Prevention and Building Code (the "Uniform Code"), comprised of the following Titles; including, but not limited to:
 - a. 2020 Building Code Of New York State (BCNYS).
 - b. 2020 Existing Building Code of New York State (EBCNYS).
 - c. 2020 Fire Code of New York State (FCNYS).
 - d. 2020 Fuel Gas Code of New York State (FGCNYS).
 - e. 2020 Mechanical Code of New York State (MCNYS).
 - f. 2020 Plumbing Code of New York State (PCNYS).
 - g. NFPA 70 - National Electric Code: Latest edition adopted by Authority Having Jurisdiction.
 - 2. The 2020 Energy Conservation Construction Code of New York State (ECCCNYS).
 - 3. The New York State Education Department (NYSED) Manual of Planning Standards:
 - a. Most recent edition adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. Where any reference is made within the Contract Documents to "applicable code" regarding the Design, Product, or Work of this project, applicable code shall be the appropriate code, herein referenced, current at time of contract document issuance.
- C. Should any reference be made to previously adopted codes, standards, or regulations contrary to the foregoing, the most current version adopted, at time of document issuance, shall govern.
- D. In the event of conflicting provisions between two referenced codes, standards, or regulations, the more stringent shall prevail.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section specifies requirements for temporary construction, utilities, facilities, and controls required to support the successful construction of the Project and maintain services until the permanent utilities, facilities, and controls are complete. They shall be installed, maintained, and removed as required to meet project conditions and contract requirements.
 - 1. General
 - a. Quality Assurance
 - b. Project Conditions
 - c. Installation
 - 2. Environmental
 - a. Environmental Protection, NPDES, and PPC
 - b. Excavation
 - c. Storm Sewers
 - d. Dewatering Facilities
 - 3. Materials & Equipment
 - a. Deliveries
 - b. Material Inventories
 - c. Materials
 - d. Equipment
 - 4. Utilities
 - a. Use charges.
 - b. Temporary electricity.
 - c. Temporary cooling.
 - d. Temporary telecommunications services.
 - 5. Facilities
 - a. Temporary sanitary facilities.
 - 6. Construction Aids & Protection
 - a. Protection
 - b. Lifts and Hoists
 - 7. Temporary Controls: Barriers, enclosures, fencing, and Traffic Regulation .
 - 8. Enclosures
 - a. Barricades, Warning Signs, and Lights
 - b. Site Enclosure Fence
 - 9. Security requirements.
 - 10. Vehicular Considerations.
 - a. Access, Staging & Parking
 - b. Traffic Regulations
 - 11. Waste removal and progress cleaning.
 - 12. Project identification.
 - 13. Field offices.
 - 14. Operation, Termination & Removal
 - 15. Protection of Property

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary.

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

1.4 GENERAL

- A. Quality Assurance
 - 1. Regulations: Comply with industry standards and applicable laws and regulations of Authorities having jurisdiction, including but not limited to:
 - a. New York State Uniform Fire Prevention and Building Code.
 - b. Health and safety regulations.
 - c. Utility company regulations.
 - d. Police, Fire Department and Rescue Squad rules.
 - e. Environmental protection regulations.
 - 2. Inspections: Arrange for Authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits. Submit copies to the Owner through the Construction Manager.
- B. Project Conditions
 - 1. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit to interfere with progress. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site. Remove, relocate and replace temporary facilities and controls as required by the progress of the Work, or as requested by the Construction Manager. The above will be done at no cost to the Owner.
 - 2. No firearms, alcoholic beverages, tobacco products or controlled substances shall be allowed on the Project at any time per local, state and federal laws/regulations. Any violators will be immediately and permanently removed from the job site.
- C. Installation
 - 1. Use of qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
 - 2. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

1.5 ENVIRONMENTAL

- A. Environmental Protection, NPDES and PPC
 - 1. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, and Architect/Engineer, their employees and agents, from claims, losses, damage, and expenses including, but not limited to, attorney's fees arising out of performance of the Work as it relates to any type of pollution related situations. This would apply to bodily injury, sickness, disease or death, or to damages or destruction or contamination of tangible property arising out of the acts or omission of the Contractor or the joint negligent acts of the Owner, Construction Manager, and Architect/Engineer, or anyone for whose acts the Contractor may be liable.
 - 2. The General Trades Contractor, prior to construction, must comply with the National Pollution Discharge Elimination System (NPDES) and submit and coordinate State and Local Preparedness, Prevention and Contingency Plans (PPC) with the Construction Manager before the start of work.

Revisions to Project Manual issued by this Addendum:

ITEM AD1-1 Refer to 01 50 00 - Temporary Facilities and Controls
AMEND subparagraph 1.15, A, 1 to read:

"A. Contractor's Field Office

1. Owner will provide space in maintenance building for temporary field office for all contractors."

3. Area must be provided and maintained by each Prime Contractor to provide protection for each individual worker, as well as the protection of property or real estate of the construction site and environment.
 4. Each Contractor shall provide protection, operate temporary facilities, and conduct construction in ways and methods that comply with all environmental regulations, and minimize the possibility that air, water, and soil become contaminated or polluted as a result of work or storage of supplies and materials, or equipment usage.
 5. Each Contractor will designate and train a responsible employee in environmental contamination procedures, including, but not limited to, emergency responses, material and waste inventories, spills and leak precautions and responses, inspections, housekeeping, security and external factors.
 6. Open burning shall not be permitted.
 7. The General Trades Contractor is responsible for dust control of the entire site as to eliminate the spread of dust to adjacent spaces within the building as well as to neighboring properties. A dust control plan shall be coordinated with the Construction Manager.
 8. The General Trades Contractor is responsible for adhering to the SWPPP requirements shown on the contract documents for the entirety of the project.
 - a. The General Trades Contractor shall employ methods required to comply with federal state and local Department of Environmental Protection requirements to control erosion from the Project site, including drainage control ditches, sediment basins, straw bale dikes, silt fencing and whatever procedure necessary to comply with requirements of the Department of Environmental Protection and any Authorities having jurisdiction.
 - b. The General Trades Contractor shall maintain these controls throughout the duration of the Project.
- B. Excavation
1. Material Protection: Any Contractor performing excavation shall protect all excavated materials from moisture, freezing and drying, so that the same materials excavated can be utilized for backfill.
 2. Shoring: The General Trades Contractor shall provide shoring for all excavations that require same per OSHA standards. Shoring must be coordinated by Each Contractor with the General Trades Contractor.
- C. Storm Sewers
1. If storm sewers are available; the General Trades Contractor shall provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available, or cannot be used, The General Trades Contractor shall provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used or discharge of effluent, provide containers to remove and dispose of effluent off site in lawful manner.
 2. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
 3. Comply with the soil erosion and sedimentation control plan and Authorities having jurisdiction.
- D. Dewatering Facilities
1. For temporary drainage and dewatering facilities, and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable codes and Authorities having jurisdiction. Where feasible, utilize the same facilities. The General Trades Contractor shall be responsible to maintain the site, excavations and construction free of water, unless noted otherwise.
 2. The General Trades Contractor shall be responsible to drain or pump water and remove debris from the site so as not to delay continuous work or progress of their work. This shall include operating pumps during second shift in order to facilitate next-day continuation of work.

3. The General Trades Contractor shall excavate in a manner that prevents all surface water from flowing into the building area. The General Trades Contractor shall continue to drain site and remove debris until designed grades are obtained.
4. Once building excavation grades are complete, The General Trades Contractor shall be responsible to remove all water and debris to install the building foundations.
5. Upon completion of building foundations, The General Trades Contractor shall be responsible to remove water and debris required to complete the work.
6. The Plumbing Contractor shall provide temporary storm water drainage from the building and The General Contractor shall control roof drainage from building and connect to storm water drainage system provided by plumber.

1.6 MATERIALS AND EQUIPMENT

A. Deliveries

1. Contractors shall coordinate delivery and storage on the jobsite of all significant materials. Deliveries will not be permitted from forty-five (45) minutes before the start of the school day to fifteen (15) minutes after the start of the school day and from (15) minutes before the end of the school day to forty-five (45) minutes after the end of the school day unless written permission is obtained from the Owner through the Construction Manager.
2. All Contractors are required to properly instruct material suppliers and vendors to address deliveries to them specifically by named responsible party at the jobsite and require advance notice.
3. All deliveries addressed to the project in general, the Owner, Construction Manager, or Architect/Engineer shall be refused and returned to the shipper.
4. The Owner will not be responsible for receipt, handling, or loss of any materials which are shipped to the Owner in error and received unknowing of relationship to the Project.
5. Contractors shall provide their superintendent with a telephone to enable locating the superintendent on and off site.

B. Material Inventories

1. Contractors shall coordinate the delivery and storage on the jobsite of all significant materials.
2. Each Contractor shall be responsible for the proper location, security, and weather resistant storage as required of all materials. This includes placement of materials not to obstruct passage on site or within building structures or in any way which causes impediment or obstruction to the Work.
3. All material inventories must be stored by the Contractor to avoid excessive loads on building structure.
4. When required for the progress of the project, a Contractor shall remove or relocate material inventories.

C. Materials

1. General: Only new, undamaged materials in serviceable condition may be used. Provide materials suitable for the use intended.
2. Lumber and Plywood: Comply with requirements in Section 06 10 00 - Rough Carpentry.
3. 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. Each Contractor shall provide tarpaulins as required for their work.
4. Water: Each Contractor shall provide potable drinking water for their workers approved by local health authorities.

D. Equipment

1. General: Only new equipment, or undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable or use intended.
2. Water Hoses: Each Contractor requiring water shall provide their own $\frac{3}{4}$ " heavy-duty, abrasion-resistant, flexible rubber hoses, with pressure rating greater than the maximum

pressure of the water distribution system; provide adjustable shut-off nozzles at host discharge.

3. Electrical Power Cords: Each Contractor shall provide their own grounded extension cords (12 Gauge minimum); 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. All power cords are to be elevated, supported and hung from structure above wherever possible to avoid trip hazards.
4. Electrical Welding Outlets: These will not be provided. Each Contractor will be responsible for their own welding power.
5. First Aid Supplies: Comply with governing regulations.
6. Fire Extinguishers: The General Contractor shall provide hand-carried, portable UL-rated, class "ABC" fire extinguishers for the entire construction area, as defined by OSHA Standards. In other locations, provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers. Comply with NFPA10 classification, extinguishing agent and size required by locations and class of fire exposure. Each Contractor shall provide fire extinguishers for their own use.

1.7 UTILITIES

A. Use Charges:

1. Cost of temporary facilities including use charges are to be paid by the Contractor requiring or providing the temporary facility unless noted otherwise.
2. The Owner shall pay electrical consumption costs during construction for all usage except temporary heat.
3. The Owner shall pay natural gas consumption costs during construction for all usage.
4. The Owner shall pay water consumption costs during construction for all usage.
5. If the permanent HVAC system is to be utilized for temporary heat, the Owner shall pay for fuel costs. If the permanent system is utilized, the Mechanical Contractor shall bear all costs associated with the maintenance of said system until final completion.

B. Utilities and Systems:

1. Contractors interrupting services due to their construction operations shall provide temporary utility lines, as required, to maintain services.
2. The Electrical Contractor shall provide temporary electrical power service where required to construction offices for all contractors and shall remove temporary service at completion of the Project. Power will be made available twenty-four (24) hours per day.

C. Temporary Utilities

1. Owner will pay cost of energy used. Exercise measures to conserve energy, utilize Owner's existing power service:
 - a. Electrical power and metering, consisting of connection to existing facilities.
 - b. Water supply, consisting of connection to existing facilities.
2. Electrical Trades Contractor shall provide and pay for all temporary power services required for construction purposes.
3. Existing facilities may not be used.
4. New permanent facilities may be used.
5. Use trigger-operated nozzles for water hoses, to avoid waste of water.

D. Temporary Telecommunications Services

1. It is the responsibility of Each Contractor to provide and maintain (including any cost) any data or phone line they deem necessary for their day to day operations.

1.8 FACILITIES

A. Temporary Sanitary Facilities

1. The Plumbing Contractor shall provide and maintain required facilities and enclosures with sanitary handwash. Facilities shall be located at staging areas and in reasonable

proximity of all work areas as directed by Construction Manager. Provide at time of project mobilization.

- a. Unit provided shall be self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber, reinforced polyester shell or similar nonabsorbent material.
2. Provide at least one unit of each twelve (12) construction personnel on site. Refer to Site Safety and Logistics plans for locations.
3. Use of existing facilities is not permitted.
4. New permanent facilities may not be used during construction operations.
5. The Plumbing Contractor shall be responsible to maintain weekly in clean and sanitary condition.
 - a. Provide all toilet supplies including toilet paper, hand sanitizer and waste receptor.
6. At end of construction, remove temporary sanitary facilities and return site to same or better condition as originally found.
7. Provide a minimum of one facility at each building site. Location of units to be field coordinated with Construction Manager.

1.9 CONSTRUCTION AIDS & PROTECTION

A. Protection:

1. The General Trades Contractor shall provide handrails and barricades on all perimeters, stairs and landings according to OSHA regulations. Provide barricades at all elevator shafts.
2. Each Contractor shall install safety coverings, as needed to protect workers from hazards associated with any open holes or other openings, including but not limited to floors, walls and roofs. This work shall comply with all OSHA requirements and remain in place until permanent construction fills those openings.
3. All Contractors upon working in any of the areas named in the above paragraph shall remove the safety covering and handrail to perform their work. Upon completion of their work for the day, lunch, or breaks, or any time when the individual Contractor is not working in that opening, the safety covering and handrail must be replaced by the Contractor removing it. At the end of each day, the General Trades Contractor shall inspect the site and install all safety coverings and handrails. At the end of the Project, or in order to install permanent construction, each Contractor shall remove coverings and handrails.
4. Each Contractor requiring access to above grade work are responsible for providing ladders, scaffolding and appropriate methods to access their work. The Contractor desiring use of in-place above grade work platforms must arrange directly with the party that owns the equipment and make all rental and insurance arrangements directly with that party.
5. All work platforms, scaffolding, etc. on the Project shall be available for access by the Owner, Construction Manager, Architect/Engineer, Authorities having jurisdiction, and Testing Agencies.

B. Lifts and Hoists

1. Lifting and hoisting of all materials and equipment will be the responsibility of Each Contractor.
2. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and shall be provided by the contractor requiring the tools and equipment.
3. Each Contractor shall be responsible to provide all site and subsurface modification preparation and replacement required to use their lifting and hoisting equipment.

1.10 ENCLOSURES

A. Barriers

1. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations.
 2. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
 3. Provide protection for plants designated to remain. Replace damaged plants.
 4. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- B. Site Enclosure Fencing
1. Construction: Commercial grade chain link fence with privacy screening.
 - a. Acceptable types of fencing include:
 - 1) Freestanding panels with appropriate base, sufficiently anchored to prevent unintentional movement or blow-over.
 - 2) Post-driven temporary supports, embedded sufficiently to support fencing and associated wind loads.
 - 3) As approved by Construction Manager.
 2. Provide 6 foot high fence around construction site; equip with vehicular gates with locks.
 3. The General Trades Contractor shall perform all fencing and barrier work to limit access to the contract area immediately upon mobilizing for Work at the beginning of the Project.
 4. The General Trades Contractor shall maintain permanent and temporary fencing throughout the duration of the Project, particularly maintaining security function of gate devices.
 5. The General Trades Contractor shall remove and replace temporary fencing as required to accommodate the work of this project.
 6. The Construction Manager during the course of construction may require the fence to be relocated as needed and as indicated on site staging plan.
- C. Barricades, Warning Signs and Lights
1. The General Trades Contractor, at the interior and entrances of the building, and the Site Contractor on site and at the exterior of the building, shall comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against.
- D. Exterior Enclosures
1. Each contractor shall be responsible for proper enclosure of their own openings for protection of exterior construction in progress and completed from exposure, bad weather, other construction operations, and similar activities and to maintain the progress schedule.
 2. The General Trades Contractor shall provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
 - a. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 3. Install tarpaulins securely with noncombustible wood framing and other materials. Close openings of 25 sq. ft. or less with plywood or similar materials.
- E. Interior Enclosures
1. The General Trades Contractor shall provide Fire Resistance Rated temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture from all trades' work into Owner-occupied areas, and to prevent damage to existing materials and equipment.
 2. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
 - a. Fire-Resistance-Rated Partitions: UL listed assembly No. U419; one hour rating, minimum, and as indicated on Code Compliance Drawings.

- b. Provide Firestop at all penetrations through Fire Resistance Rated temporary partitions.
 - c. Where doors are required, provide units listed and labeled to match the rating of the partition in which they are installed, with code compliant hardware.
3. Paint surfaces exposed to view from Owner-occupied areas.

1.11 SECURITY

- A. Each contractor shall be responsible for coordinating their own forces and providing security and protection.
- B. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
 1. The General Trades Contractor shall install substantial temporary enclosure of partially completed areas of construction. Provide and maintain locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security. This does not relieve Each Prime Contractor from responsibility for vandalism, theft, and similar violations of security to their own materials, equipment, tools and installations.
 2. The General Trades Contractor is responsible for maintaining a secure building and door locks at all times. The General Trades Contractor shall designate responsible individual or individuals that will tour the entire Project and close and secure all doors and windows and turn off non-emergency and non-security lighting at the end of each work day. The General Trades Contractor shall open all doors and turn on all lights prior to the start of each work day.
 3. Each Contractor is responsible for the secure storage for their own materials and equipment on and off the site.
 4. Each Contractor shall supply the Construction Manager with keys for any lock installed on the project.
- C. Coordinate with Owner's security program.
- D. Maintain program throughout construction period until Owner occupancy.
- E. Entry Control:
 1. Restrict entrance of persons and vehicles into Project site and existing facilities.
 2. Allow entrance only to authorized persons with proper identification.
 3. Maintain log of workers and visitors, make available to Owner on request.
 4. Owner will control entrance of persons and vehicles related to Owner's operations.
- F. Personal Identification:
 1. Provide identification badge to each person authorized to enter premises.
 2. Badge to include: Personal photograph, name and assigned number expiration date and employer.
 3. Maintain list of accredited persons, submit copy to Owner on request.
 4. Require return of badges at expiration of their employment on the Work.

1.12 VEHICULAR CONSIDERATIONS

- A. Access, Staging and Parking
 1. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
 - a. Maintain 20 feet wide driveways with turning space between and around combustible materials.
 2. Coordinate access and haul routes with governing authorities and Owner.
 3. Provide and maintain access to fire hydrants and control valves, free of obstructions.
 4. The General Trades Contractor shall provide means of dust/dirt/debris control from vehicles leaving the Construction Site and entering surrounding public streets.
 5. Existing on-site roads may be used for construction traffic.

6. The General Trades Contractor shall construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
7. The General Trades Contractor shall extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
8. The General Trades Contractor shall construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
9. Maintenance:
 - a. All site areas shall be maintained by The General Trades Contractor including public roads immediately outside property.
 - b. Snow removal for all construction roads, access roads, staging areas, Construction Manager trailer and parking will be provided by the Site Contractor. Each Contractor is responsible for all other snow removal as it pertains to their work.
 - c. The General Trades Contractor shall maintain traffic and parking areas in sound condition free of excavated material, construction equipment, product, mud, snow, and ice.
 - d. The General Trades Contractor shall maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
10. Use of site and premises for Contractor staging, access and employee parking shall be coordinated with the Construction Manager and approved by the Owner.
11. The General Trades Contractor shall provide all work required to restore site, including but not limited to construction staging area, parking, and roads during the latter time of the Project in addition to all other patching required as a result of disturbances for work of the Project including underground electric, communication, network, etc.
12. The General Trades Contractor shall provide temporary gravel parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking at location directed by Architect.
13. Existing parking areas may be used for construction parking. Tracked vehicles not allowed on pavement.
14. Permanent Pavements and Parking Facilities:
 - a. Prior to Substantial Completion, bases for permanent roads and parking areas may be used for construction traffic.
 - b. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
 - c. Use of permanent parking structures is not permitted.
15. Removal, Repair:
 - a. The General Trades Contractor shall provide all work required to restore site, including but not limited to construction staging area, parking, and roads prior to Substantial Completion, in addition to all other patching required as a result of disturbances for work of the Project including underground electric, communication, network, etc.
 - b. Remove temporary materials and construction when permanent paving is usable.
 - c. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - d. Repair existing and permanent facilities damaged by use, to original and/or specified condition.

B. Traffic Regulation

1. Signs, Signals, and Devices:
 - a. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by Authority having jurisdiction.
 - b. Traffic Cones and Drums, Flares and Lights: As approved by Authority having jurisdiction.
 - c. Flag Person Equipment: As required by Authority having jurisdiction.

2. Flag Persons: Each Contractor shall provide trained and equipped flag persons to regulate traffic when their construction operations or traffic encroach on public traffic lanes.
3. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
4. Haul Routes:
 - a. Drawings indicate haul routes designated by Authorities having jurisdiction for use of Construction traffic.
 - b. Confine construction traffic to designated haul routes.
 - c. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.
5. Traffic Signs and Signals:
 - a. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
 - b. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
 - c. Relocate as Work progresses, to maintain effective traffic control.
6. Removal:
 - a. Remove equipment and devices when no longer required. Repair damage caused by installation.
 - b. Remove post settings to depth of 2 feet.

1.13 WASTE REMOVAL AND PROGRESS CLEANING

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Each Contractor on the Project is responsible for general clean-up and trash removal resulting from the work or employees of that contract, on a daily basis. This requirement will be enforced and will result in cost assessment against the Contractor who fails to perform daily cleanup.
 1. Comply with requirements of NFPA 241 for removal of combustible waste material and debris.
 2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Dumpsters
 1. The General Trades Contractor shall provide dumpster(s) as required for the purpose of trash removal for all Contractors, unless noted otherwise.
 2. In every instance, the Prime contractor responsible for providing each dumpster shall be responsible for:
 - a. The cost of all disposal fees associated with each dumpster provided.
 - b. Flattening or crushing all trash as necessary when placed into the dumpster.
 3. Dumpsters shall be located at the site, accessible to building and roads.
 4. Hazardous materials shall not be placed in dumpsters, but shall be removed from the site by the Contractor's licensed subcontractor responsible for the material.
 5. Contractors may load legally acceptable construction debris to the designated dumpster (from this project only).
 6. Dumpsters shall remain on the project until project completion, or as directed by the Construction Manager.
- D. The Construction Manager shall coordinate the following:
 1. The location and placement of all dumpsters.
 2. The organization of weekly project clean up with Each Contractor.
 - a. All Contractors on site shall provide labor to assist in this clean up.

- E. The General Trades Contractor will be responsible for weekly broom cleaning of all floor surfaces, for dust, dirt and general trash. He will deposit the same in the dumpster.
- F. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- G. Remove trash from site weekly or when dumpster is full.
- H. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the Authorities having jurisdiction.
- I. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.14 PROJECT IDENTIFICATION

- A. Temporary Signs: The General Trades Contractor shall prepare signs to provide directional information to construction personnel and visitors as required by the Construction Manager.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

1.15 FIELD OFFICES

- A. Contractor's Field Office Optional/Contractor's Choice
 - 1. Each Prime Contractor shall provide and maintain such offices, storage and fabrication shed, and other temporary buildings or trailers on the project site as required for their own use. Contractors are advised that spaces within the existing building for storage of materials will not be available for their use. All steps and platforms connected to shelters must be per OSHA regulations. Unless written permission is obtained from the Owner through the Construction Manager, only Prime Contractors will be allowed an on-site office due to space limitations. Contractors shall provide offices for their own personnel.
 - 2. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture .
 - 3. Locate offices a minimum distance of 30 feet from existing and new structures.
 - 4. All Contractor's offices and sheds must have the Contractor's identification on them.
 - 5. Construction:
 - a. Structurally sound, secure, weather tight enclosures for office and storage spaces. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
 - b. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible and occupancy and storage requirements.
 - c. Exterior Materials: Weather resistant, finished in color acceptable to Architect/Engineer.
 - d. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floor and bases.
 - e. Lighting for Offices: 50ft C at desk top height, exterior lighting at entrance doors.
 - f. Fire Extinguishers: Appropriate type fire extinguisher at each office and each storage area.
 - g. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.
 - 6. Environmental Control:
 - a. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions. 68 degrees F heating and 76 degrees F cooling.
 - b. Use of electric space heaters will not be allowed.

- c. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.
7. Preparation: The General Trades Contractor shall fill and grade sites for temporary structures sloped for drainage away from buildings.
8. Maintenance and Cleaning:
 - a. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.
 - b. Maintain approach walk free of mud, water, and snow.
9. Removal: At completion of Work remove buildings, foundations, utility services and debris. The General Trades Contractor shall restore areas.

1.16 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Each Contractor shall enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Each Contractor shall maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 1. Maintain operation of temporary enclosures, heating cooling, humidity control, ventilation and similar facilities on a 24-hour a day basis where required to achieve indicated results and to avoid possible damage.
 2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Construction Manager requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility or not later than Substantial Completion. Complete or, if necessary restore, permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.

1.17 PROTECTION OF PROPERTY

- A. General:
 1. Each Contractor shall continuously protect the Work, other work, and the property of the Owner and others from damage, injury or loss arising in connection with the Work. Owner, Architect/Engineer, and Construction Manager shall not be responsible for any loss or damage to the Work, however caused, until after final acceptance thereof by the Owner, nor shall Owner, Architect/Engineer, or Construction Manager be responsible for loss of or damage (however caused) to materials, equipment, appliances and other personal property of Contractors used in the performance of the Work.
 2. The General Trades Contractor shall provide, erect and maintain barricades, warning signs, flags, lights as may be necessary to protect the Work and safeguard the workers and the general public. As such protection shall comply with the requirements of the proper Authorities having jurisdiction.
 3. Each Contractor shall begin repair of damages resulting from any occurrence immediately if it is a life safety or security issue or presents the imminent possibility of further damage. Otherwise repairs must begin within three days after (in the judgment of the Construction Manager) the commencement of repairs is possible.
- B. Fire Safety:
 1. Each Contractor shall store combustible materials in containers in fire-safe locations.
 2. Each Contractor shall 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.

3. Each Contractor shall provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
4. Construction Manager shall be notified prior to any and all hot work.
 - a. Each Contractor performing hot work shall provide a fire watch during and for at least 30-minutes after potential fire ignition work has been performed.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 01 50 00 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.

1.3 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.4 TEMPORARY ELECTRICITY

- A. Service Cost: By Electrical Contractor.
- B. Energy Costs: By Owner.
- C. Connect to Owner's existing power service.
 - 1. Do not disrupt Owner's need for continuous service.
 - 2. Exercise measures to conserve energy.
- D. Provide temporary electric feeder from existing building electrical service at location as directed.
- E. Power Service Characteristics: Provide GFCI distribution system, for voltages up to 208/240 volt.
 - 1. Temporary system shall be sufficient to accommodate temporary lighting and construction operations, including the use of power tools, and start-up of specified building equipment which must be tested, started or placed into use prior to completion of its permanent power connections.
 - 2. Provide weatherproof, grounded wiring with overload protection; with direct wired connections, where feasible.
 - 3. Locate multiple outlets for 120 volt power, not less than 4 gang, at each story and area of construction, spaced so that the entire area of construction can be reached by power tools on a single 100 foot extension cord. Maximum 20 Amp circuit breaker, four (4) receptacles per circuit breaker.
- F. Complement existing power service capacity and characteristics as required.
- G. Provide adequate number and size breakers and power outlets for all construction trades, with branch wiring and distribution boxes located as required. Each Contractor shall provide flexible power cords as required.
 - 1. The Electrical Contractor shall have a cord inspection program in place and shall maintain the inspection records on site. This requirement does not relieve any other user of the power or any other party in the area of the temporary power from their legal responsibilities for seeing that the system is maintained to OSHA and NEC requirements.
- H. Provide main service disconnect and over-current protection at convenient location and meter.

- I. Permanent convenience receptacles may be utilized during construction.
- J. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
 - 1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 100 sq ft of active work area.
Provide 20 ampere, single phase branch circuits for lighting.
 - 2. Construction circuits shall be separate and independent from temporary lighting.
- K. The Electrical Contractor shall provide and pay for all maintenance, servicing, operation, equipment, and supervision of lines installed.
- L. As permanent power distribution system is accepted as substantially complete, either entire system or usable portions thereof, the Electrical Contractor shall make suitable provisions for temporary use thereof, and remove unused portions of temporary system.
- M. When temporary electrical lines are no longer required, they shall be removed by the Electrical Contractor and any part, or parts of the grounds or building disturbed or damaged shall be brought back to their original condition.
- N. The Electrical Contractor shall maintain and operate permanent electrical supply and distribution system until time of final acceptance and transfer of operation to Owner's personnel.
- O. The Electrical Contractor shall provide temporary power connections to all mechanical and any additional equipment indicated on E series drawings until permanent power/new electric feeds and new electric components are in place.
- P. The Electrical Contractor will provide 24-hour temporary power to any heat tape (installed by others) on temporary water and/or fire line. All temporary heat work shall comply with existing OSHA requirements.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. The Electrical Contractor shall provide and maintain temporary lighting throughout construction site as required by local construction codes with the installation meeting the NEC and local code enforcement requirements.
- B. The Electrical Contractor shall provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight and general lighting as stated below:
 - 1. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
 - 2. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
 - 3. Provide safety lighting in the stairways, hallways, and exterior security lighting on a 24-hour basis
 - 4. Provide exterior fixtures where exposed to moisture.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required. Provide guard cages or tempered glass enclosures where exposed to breakage.
- D. Provide switching controls for all lighting which will enable turning off temporary lighting during off-construction hours.
- E. The Electrical Contractor shall maintain and operate temporary lighting and provide routine repairs.

- F. Special lighting required for construction activities shall be provided by the contractor requiring it.
- G. Permanent building lighting may be utilized during construction.
 - 1. As the permanent lighting system is substantially complete for each story or usable portion thereof, The Electrical Contractor shall make suitable provisions for temporary use thereof and remove unused portions of temporary lighting system.
 - 2. The Electrical Contractor shall maintain and operate permanent lighting system until time of final acceptance and transfer of operation to Owner's personnel, including turning off lighting during off-construction hours.
 - 3. The Electrical Contractor shall replace bulbs that are burned out or substantially dimmed by substantial hours of use or broken by construction.

1.6 TEMPORARY HEATING

- A. Cost of Equipment: By Mechanical Contractor.
- B. Cost of Energy: By Owner.
- C. Enclose building prior to activating temporary heat in accordance with Section 01 50 00.
- D. The following temporary heating specification is to be utilized and provided by The Mechanical Contractor:
 - 1. Heaters shall be direct-fired Make-up Air units with discharge modulation. Units must be designed to operate either inside or outside the building while positioned to draw 100% outside air.
 - 2. All equipment must employ squirrel cage blower for quiet operation. Noisy propane heaters will not be allowed.
 - 3. Temperature control units must have discharge modulation with remote space thermostats. Discharge temperature not to exceed 180 degrees F. No open flame visible for discharge will be allowed.
 - 4. Units must ignite pilot and prove flame before main burner is opened.
 - 5. Units to include high and low temperature shutdown.
 - 6. Heaters shall comply with all applicable state, local and OSHA regulations and shall have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
 - 7. It is required that a routine maintenance is performed at least once a month to insure the units are operating properly. This cost will be figured into the equipment unit rates and there will be no additional costs for these visits.
 - 8. All equipment to be utilized will meet the design criteria in Items 1 through 7 above.
- E. In the event of equipment failure or repairs, alternate equipment must be in place within 12 hours of failure or the Owner or Owner's Representative shall have the right to take action necessary to restore the heat to the design temperature and will deduct any and all charges from The Mechanical Contractor.
- F. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
 - 1. If the permanent heating system is not available for use when any Contractor requires that the temperature be maintained above 50 degrees (for proper installation of finishes for example), the Mechanical Contractor shall be responsible to provide the additional heating.
- G. Humidification: Where control of ambient humidity is required for proper performance of the work, or for curing/drying of installed work or for protection of installed work from deterioration due to variations ambient conditions, Each Contractor shall provide their own temporary humidification or dehumidification equipment to maintain the required conditions. Coordinate

the use of the equipment with temporary heating to produce the required conditions with a minimum overall use of energy.

- H. The Electrical Contractor shall provide power for oil or gas fired temporary heaters. It will be connected so that it can remain "live" when the temporary lighting has been turned off.
- I. The Plumbing Contractor shall provide a temporary natural gas service for required temporary heat. All supply lines for natural gas fired temporary heaters to be provided by Mechanical Contractor.
- J. As permanent heating system is substantially complete and operational for each story or usable portion thereof, The Mechanical Contract shall make suitable provisions for use thereof in temporary heating. The Mechanical Contractor shall maintain and operate permanent system for temporary heating purposes, including service to occupied areas, if any, until time of final acceptance or transfer of operation to Owner's personnel, for major parts of system if not for entire heating system.
 - 1. Warranty: the warranty, as required by the Contract Specifications, will not begin until final acceptance of the system has been given by the Architect/Engineer for all or part of a system. The warranty period does not start with the use of the equipment for temporary heating and cooling.
 - 2. All permanent heating equipment used to supply temporary heat shall be completely cleaned and reconditioned by The Mechanical Contractor prior to final acceptance. Radiator traps and valves used in the heating system during the period of its operation to supply temporary heat shall not be reinstalled in the permanent system. Install new disposable filters and clean non-disposable filters prior to final acceptance. Replace worn parts and parts that have been subject to unusual operating conditions.
- K. The Mechanical Contractor shall remove all soot, smudges, and other deposits from walls ceilings and all exposed surfaces which are the result of the use of any temporary heating equipment including the use of the permanent heating system for temporary heat purposes. Finish work shall not be done until all such surfaces are properly cleaned.

1.7 TEMPORARY COOLING

- A. Cost of Equipment: By Mechanical Contractor.
- B. Cost of Energy: By Owner.
- C. Enclose building prior to activating temporary cooling in accordance with Section 01 50 00.
- D. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
- E. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
 - 1. If the permanent cooling system is not available for use when any Contractor requires that the temperature be maintained below 80 degrees (for proper installation of finishes for example), the Mechanical Contractor shall be responsible to provide the additional cooling.
- F. As permanent cooling system is substantially complete and operational for each story or usable portion thereof, The Mechanical Contract shall make suitable provisions for use thereof in temporary cooling. The Mechanical Contractor shall maintain and operate permanent system for temporary cooling purposes, including service to occupied areas, if any, until time of final acceptance or transfer of operation to Owner's personnel, for major parts of system if not for air conditioning.
 - 1. Warranty: the warranty, as required by the Contract Specifications, will not begin until final acceptance of the system has been given by the Architect/Engineer for all or part of a system. The warranty period does not start with the use of the equipment for temporary cooling.

2. All permanent cooling equipment used to supply temporary air conditioning shall be completely cleaned and reconditioned by The Mechanical Contractor prior to final acceptance. Install new disposable filters and clean non-disposable filters prior to final acceptance. Replace worn parts and parts that have been subject to unusual operating conditions.

1.8 TEMPORARY VENTILATION

- A. A contractor requiring ventilation for work shall provide fans or other necessary equipment to ventilate and condition air as the work requires.

1.9 TEMPORARY WATER SERVICE

- A. Cost of Service: By Plumbing Contractor.
- B. Cost of Water Used: By Owner.
- C. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
 1. The Plumbing Contractor shall provide $\frac{3}{4}$ inch hose bib terminations at each level and area of construction work, so that any area of the building construction can be reached with 150' length of hose. Water service may be run from a temporary or permanent source.
 - a. Sterilization: Sterilize temporary water piping prior to use.
 - b. Protect system from freezing.
 - c. Maintain 30 psig water pressure with 5 gpm flow rate.
- D. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 10

LIFE SAFETY REQUIREMENTS DURING SCHOOL CONSTRUCTION

PART 1 GENERAL

1.1 SAFETY AND SECURITY STANDARDS

- A. Each contractor shall adhere to and be responsible for but not be limited to the life safety requirements stated in this section.
- B. General safety and security standards for construction projects:
 - 1. Comply with Regulations of the Commissioner of Education Section 155.5 Uniform Safety Standards for School Construction and Maintenance Project.
 - 2. All construction, reconstruction and Renovation work shall be performed in a manner to protect the workers and public from injury. Adjoining property and structures shall be protected from damage at all times by the Contractor(s).
 - 3. All construction materials shall be stored in a safe and secure manner.
 - 4. Fences around construction supplies or debris shall be maintained.
 - 5. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
 - 6. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent unauthorized entry.

1.2 SEPARATION

- A. Separation of construction areas from occupied spaces.
 - 1. Construction areas that are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas by code compliant construction.
 - 2. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants.
 - 3. Gypsum board on metal studs must be used in exit ways or other areas that require fire rated separation.
 - 4. Heavy-duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
 - 5. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.
 - 6. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
 - 7. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
 - 8. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday utilizing HEPA filtered vacuum system.

1.3 VENTILATION

- A. Mechanical Contractor shall provide temporary exhaust ventilation to maintain indoor air quality.
 - 1. Provide an exhaust air system for the active project areas. Exhaust layout and capacities shall be adequate for removal of VOC's, off-gases, gases, dusts, mists, or other

emissions. Points of intakes and discharges shall be field determined to protect student occupied areas. Exhaust systems shall terminate at the building exterior.

2. Objective:
 - a. Maintain a negative pressure between the work area and student occupied areas
 - b. Before start of work, submit a proposed layout for the exhaust air system. Do not begin work until approval of the Architect, Engineer, and owner is obtained. Indicate on submission locations of fans, intake points, CFM capacities and electrical requirements. Electrical contractor shall furnish power wiring to temporary equipment.
3. System operation requirements:
 - a. Provide sufficient quantity of exhaust fans in existing window openings or other approved locations to eliminate pockets of stagnant contaminated air. Capacities for equipment shall be operated in accordance with the following standards:
 - b. System operation:
 - 1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated in accordance with the following standards:
 - (a) Provide one work place air change every 15 minutes.

To calculate total air flow requirement:

$$\frac{\text{TOTAL FT}^3 \text{ MIN} = \text{VOLUME OF WORK AREA (IN FT}^3\text{)}}{15 \text{ MINUTES}}$$

To calculate the number of units needed for the work area:

$$\frac{\text{NUMBER OF UNITS NEEDED} = \text{TOTAL FT}^3 \text{ MIN}}{(\text{CAPACITY OF UNIT IN FT}^3 \text{ MIN})}$$

- 2) Work area shall be defined as phased zone ie. R-1.
- 3) Exhaust air system shall operate for a minimum of 72 hours after work is completed, or until all materials have cured sufficiently as to stop off-gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
- 4) Maintain clearance from all temporary exhaust outlets to all active building areas. Exhaust duct locations shall be approved by Architect/Engineer.

1.4 EXITING

- A. Required building exiting shall be maintained at all times so that there are no dead end conditions or corridor pockets greater than 1 1/2 x the corridor or pocket width.
- B. The General Contractor, at each building, shall provide temporary exits and related construction as required in the Construction Drawings.

1.5 FIRE AND HAZARD PREVENTION

- A. Areas of buildings under construction that are to remain occupied shall maintain a Certificate of Occupancy. In addition, all requirements itemized on the Fire Safety Inspection Report shall be in compliance during periods of student or staff occupancy; the following shall be strictly enforced.
 1. No smoking is allowed on public school property, including construction areas.
 2. During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris do not block fire exits or emergency egress windows. Each Contractor shall promptly move any

or all construction debris, materials and/or equipment as required to maintain existing passages at all times and clear during student or staff occupancy.

3. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the duration of the project.

1.6 NOISE ABATEMENT

- A. Construction activities and operations shall not produce noise in excess of 60 dBA in occupied spaces. If noise levels in occupied classroom spaces exceed 60 dBA the Contractor exceeding this limit shall provide acoustical abatement procedures or schedule activities during unoccupied times. Each Contractor is advised that the School District may schedule "no work" periods during the project. Such schedules shall not impact the Construction Schedule or Budget.

1.7 HAZARD CONTROL

- A. The Contractor shall take every precaution to eliminate the potential of construction fumes entering the occupied building. The Contractor shall take care to assure fresh air intakes do not draw construction related fumes into the building.
- B. Each Contractor shall provide for "off-gassing" of volatile organic compounds introduced during construction before occupancy. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which "off-gas" chemical fumes, gases, or other contaminants shall be aired out in a well-ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended "off-gassing" periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The work areas must be properly ventilated and the material must be given proper time to cure or "off gas" before re-occupancy.
- C. Each Contractor shall maintain the Manufacturer's Safety Data Sheets (SDS) (Formerly MSDS or Material Safety Data Sheets) at the site for all products used in the project. SDS sheets shall be provided to the School District when requested. SDS indicate chemicals used in the product, product toxicity, and typical side effects of exposure to the product and safe procedures for use of the product.
- D. Asbestos abatement protocols. All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56(12 NYCRR 56), and the federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; downloading and reading at the Department of Housing and Urban Renewal, 451 7th Street SW, Washington, DC 20410, (202) 401-0388, web site; www.hud.gov/search.html, scroll web page to Reading Room, click on Bookshelf 10: Lead Paint). Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be performed in unoccupied areas of an occupied building in accordance with the above referenced regulations. For more information on Asbestos Abatement see Section 02 21 10 Asbestos Abatement.
- E. Lead Based paint: Lead based paint has been identified as being applied to some building components that are to be selectively demolished. Lead based paint testing has been performed and a report is on file and available for review and use. It is the Contractor's

responsibility to become familiar with areas containing lead based paint and to communicate the presence of lead based paint to all employees.

1. Effective April 22, 2010 all contractors are required to conform to the Environmental Protection Agency's (EPA) Lead Renovation, Repair and Painting (RRP) program. This regulation has been developed to prevent lead contamination when performing renovation, repair and painting projects which disturbs lead based paint in homes, child care facilities and schools built before 1978 if these buildings are visited regularly by any child under 6 years of age.
 2. Any abatement work required shall be performed by a certified firm employing workers trained and certified for lead based paint activities. All work is to be performed in accordance with all applicable regulations including: 40 CFR 745 (USEPA), 29 CFR 1926 (OSHA), (HUD) Federal Housing and Urban Development Regulations and New York State Education Department requirements.
 3. All contractors involved with lead based paint activities shall be certified in lead-safe practices as detailed in the Code of Federal Regulation 40 CFR, Part 745.
 4. Contractors must document compliance with this requirement. EPA's <<http://www.epa.gov/lead/pubs/renovaterightbrochuresp.pdf>> may be used for this purpose.
 5. For more information regarding this regulation visit the EPA website at www.epa.gov/lead/pubs/renovation.htm for requirements.
 6. Should paint suspected of containing lead, but not identified within the report be encountered, do not disturb the suspect material, and immediately notify the Architect.
- F. (PCB) Polychlorinated Biphenyl: Locations of PCB containing window and door sealants have been identified on the contract drawings. Where present, PCB contaminated window and door sealants shall be removed and disposed of in accordance with U.S. E.P.A. Toxic Substances Control Act 40 CFR 761. Disposal of contaminated material shall also conform to the NYSDEC solid waste regulations (6NYCRR Part 360) if concentrations are less than 50 ppm and in accordance with (6NYCRR370-373 if concentrations are 50 ppm or greater. PCB sampling has been performed and a copy of the test reports for contaminated materials is included at the end of this section. It is the contractor's responsibility to become familiar with areas contaminated with PCB and to communicate the presence of contaminated materials to all employees. Should a material suspected of being contaminated by PCB, but not identified within the report be encountered, do not disturb the suspect material, and immediately notify the Architect.

1.8 POST CONSTRUCTION INSPECTION

- A. Each Contractor is advised that the School District shall be provided the opportunity for a walk-through inspection by the School District's health and safety committee members to confirm building safety during construction and that the area is ready to be reopened for occupancy.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Sustainable design-related product requirements.
- C. Re-use of existing products.
- D. Transportation, handling, storage and protection.
- E. Product option requirements.
- F. Substitution limitations.
- G. Procedures for Owner-supplied products.
- H. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Lists of products to be removed from existing building.
- B. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 40 00 - Quality Requirements: Product quality monitoring.
- D. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- E. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.3 REFERENCE STANDARDS

- A. 16 CFR 260.13 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; Recycled Content; Current Edition.
- B. ASTM D6866 - Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis; 2018.
- C. C2C (DIR) - C2C Certified Products Registry; Cradle to Cradle Products Innovation Institute; Current Edition.
- D. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; 2014.
- E. GreenScreen (LIST) - GreenScreen for Safer Chemicals List Translator; Clean Production Action; Current Edition.
- F. GreenScreen (METH) - GreenScreen for Safer Chemicals Method v1.2; Clean Production Action; Current Edition.
- G. ISO 14025 - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures; 2006.

- H. ISO 14040 - Environmental management -- Life cycle assessment -- Principles and framework; 2006.
- I. ISO 14044 - Environmental management -- Life cycle assessment -- Requirements and guidelines; 2006 (Amended 2017).
- J. ISO 21930 - Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services; 2017.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.5 QUALITY ASSURANCE

- A. Bio-Based Content: Of vegetable or animal origin, not including products made by killing the animal.
 - 1. Determine percentage of bio-based content in accordance with ASTM D6866.
 - 2. Bio-based content must be sourced from a Sustainable Agriculture Network certified farm.
- B. Cradle-to-Cradle Certified: End use product certified Cradle-to-Cradle v2 Basic or Cradle-to-Cradle v3 Bronze, minimum, as evidenced by C2C (DIR).
- C. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
 - 1. Good: Product-specific; compliant with ISO 14044.
 - 2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.
- D. GreenScreen Chemical Hazard Analysis: Ingredients of 100 parts-per-million or greater evaluated using GreenScreen (METH).
 - 1. Good: GreenScreen (LIST) evaluation to identify Benchmark 1 hazards; a Health Product Declaration includes this information.

2. Better: GreenScreen Full Assessment.
 3. Best: GreenScreen Full Assessment by GreenScreen Licensed Profiler.
 4. Acceptable Evidence: GreenScreen report.
- E. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using one of the HPDC (HPD-OLT) online tools.
- F. Manufacturer's Inventory of Product Content: Publicly available inventory of every ingredient identified by name and Chemical Abstract Service Registration Number (CAS RN).
1. For ingredients considered a trade secret or intellectual property, the name and CAS RN may be omitted, provided the ingredient's role, amount, and GreenScreen Benchmark are given.
- G. Recycled Content: Determine percentage of post-consumer and pre-consumer (post-industrial) content separately, using the guidelines contained in 16 CFR 260.13.
1. Previously used, reused, refurbished, and salvaged products are not considered recycled.
 2. Wood fabricated from timber abandoned in transit to original mill is considered reused, not recycled.
 3. Determine percentage of recycled content of any item by dividing the weight of recycled content in the item by the total weight of materials in the item.
 4. Determine value of recycled content of each item separately, by multiplying the content percentage by the value of the item.
 5. Acceptable Evidence:
 - a. For percentage of recycled content, information from manufacturer.
 - b. For cost, Contractor's cost data.
- H. Reused Products: Materials and equipment previously used in this or other construction, salvaged and refurbished as specified.
1. Wood fabricated from timber abandoned in transit after harvesting is considered reused, not recycled.
 2. Acceptable Evidence: Information about the origin or source, from Contractor or supplier.
- I. Source Location: Location of harvest, extraction, recovery, or manufacture; where information about source location is required to be submitted, give the postal address:
1. In every case, indicate the location of final assembly.
 2. For harvested products, indicate location of harvest.
 3. For extracted (i.e. mined) products, indicate location of extraction.
 4. For recovered products, indicate location of recovery.
 5. For products involving multiple manufacturing steps, provide a description of the process at each step, with location.
 6. Acceptable Evidence:
 - a. Manufacturer's certification.
 - b. Life cycle analysis (LCA) performed by third-party.
- J. Sustainably Harvested Wood: Solid wood, wood chips, and wood fiber certified or labeled by an organization accredited by one of the following:
1. The Forest Stewardship Council, The Principles for Natural Forest Management; for Canada visit <http://www.fscscanada.org>, for the USA visit <http://www.fscus.org>.
 2. Acceptable Evidence: Copies of invoices bearing the certifying organization's certification numbers.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.
 - 1. See Section 01 10 00 for list of items required to be salvaged for reuse and relocation.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made outside the United States, its territories, Canada, or Mexico.
 - 2. Made using or containing CFC's or HCFC's.
 - 3. Made of wood from newly cut old growth timber.
 - 4. Containing lead, cadmium, asbestos, or mercury.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 61 16.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 4. Have longer documented life span under normal use.
 - 5. Result in less construction waste. See Section 01 74 19
 - 6. Are made of vegetable materials that are rapidly renewable.
 - 7. Are made of recycled materials.
 - 8. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
 - 9. If bio-based, other than wood, are or are made of Sustainable Agriculture Network certified products.
 - 10. Are Cradle-to-Cradle Certified.
 - 11. Have a published Environmental Product Declaration (EPD).
 - 12. Have a published Health Product Declaration (HPD).
- D. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- E. All electrical products, components and packaged systems are to be approved and labeled by a nationally recognized testing agency such as Underwriters Laboratory (UL) or equal.
- F. Provide interchangeable components by the same manufacture for components being replaced.
- G. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

- H. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.4 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 25 00 - Substitution Procedures.

3.2 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide off-site storage and protection when site does not permit on-site storage or protection.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 61 16
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.
- C. Requirement for installer certification that they did not use any non-compliant products.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Section 01 33 29.07 - Prohibited Content Installer Certification: Form for certifying that no non-compliant products were used.
- C. Section 01 40 00 - Quality Requirements: Procedures for testing and certifications.

1.3 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
 - 7. Exterior applied products (for LEED Healthcare and Schools projects only).
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.4 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 D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- D. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).
- E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
- C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

1.6 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. 6 CRR-NY, Chapter III, Subpart A.
 - c. SCAQMD 1113 Rule.
 - d. CARB (SCM).

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination.
- B. Examination, preparation, and general installation procedures.
- C. Progress cleaning.
- D. Protection of installed work.
- E. System start-up.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Testing, adjusting and balancing.
- J. Final cleaning.
- K. Closeout procedures.
- L. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.3 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

1.4 COORDINATION

- A. See Section 01 10 00 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and

conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.4 PROGRESS CLEANING

- A. All contractors shall be responsible for daily cleaning of work areas as described.
- B. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- C. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- D. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- E. Collect and remove waste materials, debris, and trash/rubbish from site daily and dispose off-site; do not burn or bury.

3.5 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.6 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.7 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.8 TESTING, ADJUSTING AND BALANCING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.9 FINAL CLEANING

- A. The General trades Contractor shall employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Execute final cleaning operations before requesting inspection for certification of Substantial Completion.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- C. Use cleaning materials that are nonhazardous.
- D. Clean interior and exterior glass, including mirrors, door glass, windows, and surfaces exposed to view. Polish transparent and glossy surfaces.
 - 1. Remove temporary labels, stains and foreign substances.
 - 2. Remove glazing compounds and other substances that are noticeable vision-obscuring materials.
 - 3. Replace chipped or broken glass and other damaged transparent materials.
- E. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- F. Clean exposed exterior and interior hard surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted and soft surfaces.

- G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- H. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- I. Clean filters of operating equipment.
- J. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even textured surface.
- K. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 3. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases, including but not limited to:
 - a. Affidavit of Release of Liens on AIA Form G706-A:
 - 1) From Contractor
 - 2) From Subcontractor(s)
 - 3) From Major Material Supplier(s)
 - b. Affidavit of Debts and Claims Payment on AIA G706:
 - 1) From Contractor
 - 2) From all tiers of Subcontractor(s)
 - c. Consent of Surety on AIA G707 From Contractor.
 - d. One (1) year warranty from date of Substantial Completion.
 - 4. Submit final record information.
 - 5. Complete final cleanup requirements, including touchup painting.
 - 6. Touch up and otherwise repair and restore marred, exposed finishes.
- B. Inspection Procedures: Upon receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
 - 2. Results of the completed inspection will form the basis of requirements for final acceptance.

3.11 FINAL ACCEPTANCE

- A. Each Contractor shall submit, prior to requesting final inspection, written certification that:

1. Work has been completed in accordance with contract documents, listing any exceptions.
 2. Project has been inspected for compliance with contract documents.
 3. Equipment and systems have been tested in the presence of the Construction Manager and are operational and video-taped instructions prepared and submitted through the Construction Manager to the Architect and Owner.
 4. Owner's designated staff have been instructed on all equipment and systems and an Owner signed receipt furnished through the Construction Manager to the Architect.
 5. Operational and Maintenance Manuals have been submitted through the Construction Manager and reviewed by the Architect.
 6. Owner has been furnished the specified warranties, guarantees and spare parts and an Owner signed receipt furnished to the Architect.
 7. Project has been completed and is ready for final inspection.
- B. If the Architect and Construction Manager considers the work complete in accordance with the requirements of the Contract Documents, the Contractor will submit his final requisition (including final changes to the Contract Sum) together with the following through the Construction Manager to the Architect.
1. AIA G706 - Contractor's Affidavit of Payments of Debts and Claims.
 2. AIA G706-A - Contractor's Release of Liens and Waiver of Liens.
 3. AIA G707 Consent of Surety to Final Payment.
 4. Evidence of continuing insurance coverage.
- C. If the Architect and Construction Manager does not consider the work finally complete, the Contractor will be notified, in writing by the Architect with a copy to the Construction Manager, with the reasons stated.
- D. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. The Contractor shall achieve FINAL COMPLETION of all Work, including correction of punch list items, preparation and delivery of manuals, presentation of training and completion of final paper submissions not later than sixty (60) days following the Contract-scheduled Substantial Completion date. In the event the Contractor shall fail to achieve Final Completion in a timely manner in accordance with this provision, the Contractor and the Contractor's Surety shall be liable for and shall reimburse the Owner for any and all Architectural or Construction Manager fees, materials or expenses made necessary by the Contractor's failure. Additional fees and expenses shall be charged by the Owner against any Final Payment due or which may become due the Contractor.

3.12 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities. Refer to Section 01 78 00 - Closeout Submittals.
 1. Provide copies to Architect/Engineer.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Substantial Completion.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Accompany Project Coordinator on Contractor's preliminary final inspection.
- H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.
- J. Submit final application for payment identifying total adjusted contract sum, previous payments and sum remaining due.

3.13 GENERAL REQUIREMENTS FOR MAINTENANCE SERVICE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood.
 - 5. Land clearing debris, including brush, branches, logs, and stumps.
 - 6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 7. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (<http://flooring.dupont.com>) and Interface (www.interfaceinc.com) conduct reclamation programs.
- E. Contractor Reporting Responsibilities: Submit periodic Waste Disposal Reports; report landfill disposal, incineration, recycling, salvage, and reuse regardless of to whom the cost or savings accrues; use the same units of measure on required reports.
- F. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 25 00 - Substitution Procedures.
- B. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- C. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- D. Section 01 60 00 - Product Requirements: Waste prevention requirements related to product substitutions.
- E. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

- F. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.

- b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards.
 - c. Include weight tickets as evidence of quantity.
 7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

- A. See Section 01 60 00 and Section 01 25 00.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.
- D. Spare Parts and Maintenance Products

1.2 RELATED REQUIREMENTS

- A. Section 00 72 14 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit draft of completed documents in electronic format 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit one hard copy set and one electronic copy on thumb drive of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.

- P. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
1. Project Directory.
 2. Table of Contents, of all volumes, and of this volume.
 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.
 4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.
- K. Electronic Format: Operation and maintenance data in electronic format shall be assembled and arranged as prescribed for hard copy manuals.
1. All content shall be:
 - a. In individual documents, using .pdf format.
 - b. Organized into named folders.
 - c. In a fully searchable format.
 - d. Saved to high quality thumb drive.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for

items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

3.7 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

END OF SECTION

SECTION 02 21 10
ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Laboratory reports with summary of bulk asbestos analysis results are available in the Architect/Certified Project Designer's office.
- B. The contractor shall be responsible for investigating the site and verifying conditions and quantities prior to the submission of his bid. The contractor shall not be permitted changes in the contract amount if specific variances are denied by New York State Department of Labor, Architect/Certified Project Designer, or any other agency.
- C. A site specific variance may be applied for at the contractor's cost. Use of a site specific variance requires approval of the Asbestos Abatement Project Designer.

1.2 REGULATORY REQUIREMENTS

- A. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- B. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- C. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.
- D. NYS DEC Title 6 NYCRR Part 360 - Solid Waste Management Facilities General Requirements; current edition.
- E. NYS DEC Title 6 NYCRR Part 364 - Waste Transporters; current edition.
- F. NYS DOH Title 10 NYCRR Part 73 - Asbestos Safety Program Requirements; current edition.
- G. NYS DOL Title 12 NYCRR Part 56 - Asbestos; current edition.
- H. USEPA Title 40 CFR Part 61 - National Emissions Standards for Hazardous Air Pollutants; current edition.
- I. USEPA Title 40 CFR Part 763, Subpart E - Asbestos Containing Materials in Schools; current edition.
- J. USEPA 530-SW-85-007 - Asbestos Waste Management Guidance; current edition.

1.3 SCOPE

- A. All work of this section shall be performed in accordance with 12 NYCRR Part 56 as most currently amended unless permitted otherwise by the NY State Department of Labor, the USEPA and the Owner's Representative.
- B. The contractor shall conform to Title 10 NYCRR Part 73 as most currently amended.
- C. Furnish all labor, materials, licenses, facilities, equipment, services, employee training and testing, permits and agreements necessary to perform the work required for asbestos removal, encapsulation and enclosure in accordance with these specifications, the latest regulations from the U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Asbestos Hazard Emergency Response Act (AHERA), the State of New York, the recommendations of the National Institute of Occupational Safety and Health (NIOSH) and Standard 241 of the National Fire Protection Association (NFPA).

- D. All work shall be performed in accordance with the U.S. Environmental Protection Agency (EPA) 40 CFR Part 763, Subpart E, AHERA Regulations for Removal of Asbestos in Schools; (EPA) 40 CFR Part 61, and OSHA Title 29 CFR, Part 1910; sections 1001, 134, 1926.2 and 1926.1200. All work shall also be performed in accordance New York State Department of Health Title 10 NYCRR Part 73 and Department of Environmental Conservation Title 6 NYCRR Part 364

1.4 SUBMITTALS

- A. Pre-Work Submittals: The Contractor shall submit to the Architect/Certified Project Designer three (3) copies of the documents listed below:
 - 1. Resume: Shall include the following:
 - a. Contractor license issued by New York State Dept. of Labor.
 - b. The number of years engaged in asbestos removal.
 - c. Provide a list of projects performed within the past two years and include the dollar value of all projects. Provide project references to include owner, consultant, and air-monitoring firms' name, contact person, address, and phone number.
 - d. An outline of the worker training course and medical surveillance program conducted by the contractor.
 - e. Emergency plans, including proposed work area evacuation routes and fire extinguisher locations.
- B. Citations/Violations/Legal Proceedings: Submit a notarized statement describing:
 - 1. Any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.
 - 2. Any Stop Work Orders issued on projects within the past two years.
 - 3. Any litigation or arbitration proceedings arising out of performance on past projects.
 - 4. Any liquidated damages assessed within the last two years.
- C. Progress Schedule:
 - 1. Show the complete sequence of construction by activity and the sequencing of work within each building or section of the work.
 - 2. 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.
 - 3. Show final inspection dates.
- D. Site Specific Variance: Submit all proposed site specific variances for this project to the Architect for review and approval.
- E. Schedule of Values: Prepare a schedule of values, as required by the General Conditions identifying the value of work, by work area, associated with each type of asbestos material included in the scope of work. Identify mobilization and administration costs separately.
- F. Notifications: Submit notifications required by federal, state, and local regulations together with proof of timely transmittal to agencies requiring the notice (e.g. certified mail return receipt).
- G. Permits: Submit copies of current valid permits required by state and local regulations, including arrangements for storage, transportation, and disposal of contaminated materials.
- H. Abatement Work Plan: Provide plans which clearly indicate all work areas (numbered sequentially) including the locations and types of all decontamination chambers, entrances and exits to the work area, type of abatement activity/technique, number and location of negative air units and exhaust including calculations, and the proposed location and construction of storage facilities and field office.

- I. Equipment: Submit manufacturer's information of vacuums, negative air pressure equipment, respirators, and air supply equipment, etc. Provide certification that all equipment meets applicable requirements of OSHA and EPA.
- J. Worker Training and Medical Surveillance: The Contractor shall submit a list of the persons who will be employed by him and his subcontractors in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
- K. (Sub)-subcontractors List: The abatement (sub)-contractor shall submit a list of all sub-subcontractors to be used on the project.
- L. Project Supervisor: Submit the resume of the proposed Project Supervisor. Identify work history and substantiate ability to supervise this project.
- M. Rental Notifications: Submit copies of notices sent to rental suppliers informing them of the nature of the work that the contractor intends to use the equipment for.
- N. Worker's Acknowledgments: Submit 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.
- O. Project Closeout Submissions:
 - 1. Submit copies of all waste disposal manifests, and disposal logs.
 - 2. Submit OSHA compliance air monitoring records conducted during the work.
 - 3. Submit copies of the daily progress log.
 - 4. Submit copies of the visitor's log.
 - 5. Submit Certificate of visual inspection obtained from the Project Monitor.
 - 6. Submit a list of all employees utilized on the project with social security and Asbestos Handler Certificate numbers.
 - 7. Submit copies of any required Employee Statements such as Medical Examination statement, Certificate of Worker's Release, or Employee Training Statement.
 - 8. Submit 3 copies of a description of work to be included in the Owner's AHERA Management Plan Building record. Indicate asbestos materials removed and quantities for each area(s) of abatement.

1.5 PROJECT SUPERVISOR

- A. The Contractor shall designate a full-time Project Supervisor who shall be on-site at all times work is in progress. If the Project Supervisor is not on-site, all work shall be stopped. The Project Supervisor must be able to read and write English fluently, as well as communicate with his workers. The Project Supervisor shall remain until the project is complete and cannot be removed without the written consent of the Owner and the Architect/Certified Project Designer.
- B. Prior to the commencement of work, the Contractor shall submit the proposed Project Supervisor's resume to the Owner and Architect/Certified Project Designer for approval. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.58 and shall have a minimum of one-year on-the-job training. This person shall hold certification as an Asbestos Project Supervisor.

1.6 ASBESTOS PROJECT MONITOR, AIR SAMPLING AND ANALYSIS FIRM

- A. An Asbestos Project Monitor, Air Sampling and Analysis firm shall be retained by the Owner to provide abatement project inspection and monitoring services and to conduct air sampling and provide laboratory analysis of air samples. This firm is responsible for ensuring that all abatement activities are in full compliance with all applicable federal, state, and local laws, rules, and regulations, and the contract documents. Air sampling and analysis required by

OSHA regulations to be performed by the contractor shall be the responsibility of the contractor and will not be performed by the Air Sampling and Analysis Firm.

- B. The Asbestos Project Monitor shall have personnel on-site at all times the contractor is on-site. The contractor shall not be permitted to conduct any work, including mobilization and preparation, unless the Asbestos Project Monitor consultant is on-site.
- C. The Asbestos Project Monitor, and his on-site representative, shall have the authority to direct the actions of the contractor verbally and in writing to ensure compliance with the project documents and all regulations. The Asbestos Project Monitor shall have the authority to stop work when gross work practice deficiencies or unsafe practices are observed or ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.
- D. The Asbestos Project Monitor shall provide the following functions:
 - 1. Inspections of contractor's work, practices, and procedures for compliance with all regulations and project specifications. Notify the Owner/Architect of contractor non-compliance during the project.
 - 2. Maintain a daily log on-site of all activities undertaken by the contractor, all visitors to the site, and any unusual events.
 - 3. The inspector shall turn over copies of all daily logs, air-monitoring results, and any other reports prepared in the field to the Architect/Certified Project Designer.
 - 4. Verify daily that all workers used in the performance of the project is certified by the appropriate regulatory agency.
 - 5. Monitor the progress of the contractor's work and report any deviations from the schedule to the Architect/Certified Project Designer.
 - 6. Monitor, verify, and document all waste load-out operations. The Project Monitor shall maintain a disposal log indicating the time, date, quantity, and destination (including hauler information) of all waste removed from the site.
 - 7. The Project Monitor shall ensure that the waste disposal procedures are being followed, including the use of container seals and the Authority's waste manifest.
 - 8. Verify that the contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
 - 9. Verify that all materials and equipment delivered to the site are in conformance with the contract documents and approved submittals.
 - 10. Ensure that all warning signs and notices required of the owner and the contractor are posted.
 - 11. Inspect each work area prior to abatement activities and document building damages prior to and after the abatement contractor performs the work.
 - 12. Inspect each work area to verify total asbestos abatement in accordance with the contract documents prior to clearance air sampling.
 - 13. Attend regular meetings to discuss project related issues.
 - 14. Deliver a bound final report to the Owner within 30 days of the completion of monitoring services which contains all project monitoring and air sampling documentation, credentials, an executive summary of the activities included in the report, and a statement that confirms that all monitoring and air sampling has been completed in compliance with New York State Department of Labor and Environmental Protection Agency regulations.
 - 15. The selected monitoring company shall NOT be permitted to provide testing and/or consulting services to the selected asbestos abatement contractor for any work on this project.
- E. The Project Monitoring services have been contracted for Monday through Friday, 8 hours per day. The time lines that have been established are based on the Owner's needs and the Contractor completing the work with sufficient manpower, supplies and organization within the scheduled time. If more hours are needed due to a lack of the Contractor's ability to meet the scheduled time lines, the cost for additional Project Monitoring and Air Sampling shall be the responsibility of the contractor.

1.7 AIR SAMPLING REQUIREMENTS

- A. Air Sampling shall be conducted as required by New York State regulations.
- B. Unless otherwise required by applicable regulations, samples shall be analyzed by Phase Contrast Microscopy (PCM) and final clearance air samples by Transmission Electron Microscopy (TEM) as outlined by paragraphs below. Chain of Custody must be maintained for all samples.
- C. Analytical services shall be provided by a laboratory certified by the New York State Department of Health Environmental Laboratory Approval Program specifically for the analytical procedure being used.
- D. Air sampling shall be performed by an individual with at least six months experience in abatement project air sampling and shall hold certification as a New York State Asbestos Handler or Asbestos Project Air Sampling Technician as required by applicable New York State regulations.
- E. The Asbestos Project Air Sampling Technician shall maintain a log on-site of all air monitoring conducted and the results of such monitoring.
- F. The air sampling technician must have an adequate quantity of equipment required to conduct the necessary air monitoring, including a sufficient number of air sampling pumps as well as leaf blowers and fans required for aggressive clearance air monitoring.
- G. To help maintain scheduled time lines, the work is divided into work areas for air monitoring as grouped below. Each area shall have separate pre, during and post abatement monitoring.
- H. Pre-abatement air samples shall be collected before the contractor arrives on site.
- I. During abatement samples shall be collected at locations selected by the PM/AST.
- J. Inside air samples shall be collected by the PM/AST. These samples shall not be used to satisfy the contractor's responsibility for personal sampling.
- K. TEM and PCM final air samples shall be collected in the same locations as the pre-abatement air samples.
- L. Required Inspections - The following minimum inspections shall be conducted by the Asbestos Project Monitor. Additional inspections shall be conducted as required by project conditions. Progression from one phase of work to the next by the contractor is only permitted with the written approval of the Project Monitor.
 - 1. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the work areas and to documents these conditions. It shall be conducted with the owner, Asbestos Project Monitor, contractor, and the Architect/Certified Project Designer (as appropriate) prior to release of the building to the abatement contractor.
 - 2. Pre-Commencement Inspection: The purpose of the inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the work area is fully prepped for removal.
 - 3. Work Inspections: The purpose of this inspection is to monitor the work practices and procedures employed on the project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the Asbestos Project Monitor during preparation and removal activities at least twice every work shift.
 - 4. Visual Clearance Inspection: The purpose of this inspection is to verify the contractor's certification that all materials have been removed from the work area and the absence of all visible accumulations of debris in the work area. This inspection shall be conducted after encapsulation and removal of all surface plastic in the area, but before final air clearance testing. Critical barriers shall remain in place.

5. Punch List Inspection: The purpose of this inspection is to verify the contractors' certification that all work has been completed as contracted and the condition of the existing area prior to its release to the owner.
- 1.8 MINOR ASBESTOS ABATEMENT PROJECT (LESS THAN OR EQUAL TO 25 LINEAR FEET OR 10 SQUARE FEET)(TENT/MINI ENCLOSURES)
 - A. Pre-abatement air sampling/during-abatement air sampling; In compliance with New York State Department of Labor approved specific variance.
 - B. Final clearance air sampling; In compliance with New York State Department of Labor approved specific variance and New York State Education Department Final Clearance Air Sampling clarification dated August 2007:
 1. For areas up to Three (3) square feet or Three (3) linear feet; provide One (1) aggressive air sample inside and One (1) standard air sample outside the work area plus required blanks. Analysis by TEM.
 2. For areas over Three (3) square feet or Three (3) linear feet but less than Twenty-Five (25) linear feet or Ten (10) square feet; provide Five (5) aggressive air samples inside and One (1) standard sample outside the work area plus required blanks. [Analysis by TEM.
 - 1.9 SMALL ASBESTOS ABATEMENT PROJECT (LESS THAN 260 LINEAR FEET OR 160 SQUARE FEET, GREATER THAN 25 LINEAR FEET OR 10 SQUARE FEET)
 - A. Pre-abatement sampling; Three (3) samples inside and three (3) samples outside the work area plus required blanks. Analysis by PCM
 - B. During abatement; if required, during abatement air sampling shall be in compliance with New York State Department of Labor Applicable Variance and/or approved Specific Variance. Analysis by TEM. (Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
 - C. Final clearance air samples;
 1. Five (5) aggressive air samples inside and three (3) standard samples outside the work area plus required blanks. Analysis by PCM. Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
 2. If one or both sets of samples do not meet the above stated final clearance air sample criteria, the contractor shall re-clean the work area and a complete duplicate set of final clearance air samples shall be collected by the Project Monitor/Air sample Technician. The contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.
 - 1.10 LARGE ASBESTOS ABATEMENT PROJECT (260 LINEAR FEET OR 160 SQUARE FEET OR GREATER)
 - A. Pre-abatement sampling; Five (5) samples inside and five (5) samples outside the work area plus required blanks. Analysis by PCM
 - B. During abatement; Five (5) samples outside the work area plus required blanks. Analysis by PCM
 - C. Final clearance air samples;
 1. Up to five (5) aggressive air samples inside and five (5) standard outside the work area plus required blanks. Analysis by TEM. Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
 2. If one or both sets of samples do not meet the above stated final clearance air sample criteria, the contractor shall re-clean the work area and a complete duplicate set of final

clearance air samples shall be collected by the Project Monitor/Air sample Technician. The contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.

1.11 SCOPE OF WORK

- A. The quantities listed in the tables are for informational purposes ONLY. The contractor shall be responsible for ALL asbestos containing materials within the work areas.
- B. Work areas are as follows:
 - 1. Work Area #1 – Involves the abatement of asbestos containing caulk and flooring in renovated areas - Area A.
 - a. Floor, on Concrete: 12"x12" Floor Tile & Mastic: 800 SF
 - b. Window, Glass to Metal Caulk: 10 SF
 - 2. Work area #2- Involves the abatement of asbestos containing sinks (undersink tar coating), joint compound soffits and walls, and vinyl flooring in renovated areas - Area B.
 - a. 2nd Floor, Room B211A, Floor, on Concrete (Kitchen Storage) Floor Tile & Mastic: 100 SF
 - b. 2nd Floor, Room B216 & B216A, Floor, on Concrete Floor Tile & Mastic: 1,200 SF
 - c. 2nd Floor, Kitchen, on Sheetrock Wall Joint Compound: 120 SF
 - d. Anti-Sweat Tar, Black, Undersink: Locations indicated on drawings.
 - 3. Work area #3- Involves the abatement of asbestos containing sinks (undersink tar coating), and 12x12 ceiling tile (and mastic) as indicated in classroom D216, in renovated areas - Second Floor Areas C & D Classrooms.
 - a. 2nd Floor, Corridor D201/Stair, Floor, on Concrete Floor Tile & Mastic: 500 SF
 - b. 12x12 ceiling tile and mastic (above drop ceiling) in D216: 100 SF
 - c. Anti-Sweat Tar, Black, Undersink: Locations indicated on drawings.
 - 4. Work area #4- Involves the abatement of asbestos containing sinks (undersink tar coating), and joint compound in soffits/walls above in renovated Music Classroom- Area D.
 - a. 3rd Floor, Room D305, Wall, Above Cabinets, on Sheetrock Wall Joint Compound: 50 SF
 - b. Anti-Sweat Tar, Black, Undersink: Locations indicated on drawings.
- C. Dumpster locations and lift usage shall be subject to acceptance by the Architect/Certified Project Designer.
- D. If final clearance air samples do not meet the criteria as regulated by New York State Department of Labor and the New York State Education Department, the contractor shall re-clean the work area and a complete, duplicate set of final clearance air samples, shall be collected by the Project Monitor/Air Sampling Technician. The Contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.
- E. An asbestos demolition survey is available for review. The contractor shall be responsible for the abatement of all asbestos containing materials in preparation for demolition by others. If bulk sampling is required to determine a complete abatement the Owner shall perform all testing, and all sampling costs shall be the responsibility of the Contractor.
- F. Only low odor mastic remover shall be approved for use. Mastic remover must be thoroughly cleaned from all areas of the building. Permeable materials (wood, drywall, carpets, plaster, etc.) must be protected from absorbing the mastic remover solvents. Mastic remover application and cleanup instructions must be strictly followed. A minimum of two soap and water washes must be provided on all surfaces where mastic remover was applied. The asbestos abatement contractor shall be responsible to assure that the mastic remover is compatible with scheduled finishes to maintain all product system warranties.

- G. Mastic shall be removed thoroughly to the point at which scraping mastic with a metal scraper will not produce build-up of mastic material on the scraper.
- H. The abatement contractor shall disconnect and remove existing unit ventilators and unit ventilator metal shelving. The asbestos abatement contractor shall removal vinyl asbestos floor tile below unit ventilator and unit ventilator shelving. The abatement contractor shall reconnect existing unit ventilators and unit ventilator shelving to existing layout.
- I. Any encapsulant, mastic remover or other product used, shall be compatible with the new finishes. It shall be the contractor's responsibility to coordinate the product being used with the new finish products. No encapsulant, mastic remover and/or other product shall be used that has not been approved.
- J. Roof mechanical shut down, if needed, shall be coordinated with the Owner and/or the Owner's representative.
- K. The contractor shall be responsible to employ removal methods, sufficient cleaning and/or other such means, methods or equipment to provide areas free of odors, fumes, and/or irritants or residues. The contractor shall respond and remove the cause of such odors, fumes or irritants at its own expense if notified by the Owner or Architect/Certified Project Designer, within six months of the date of substantial completion.

1.12 LICENSING AND CERTIFICATION

- A. The contractor must have successfully completed a contractor supervisor course approved by the EPA.
- B. The contractor must hold a valid State of New York, Department of Labor asbestos contractor's license. A copy of this asbestos license shall be conspicuously displayed proximate to but outside the work area during the duration of the project.
- C. The contractor shall permit only those persons who hold valid State of New York Department of Labor asbestos handling certificates to engage in work on this project.
- D. The Contractor shall have EPA Certification as an Asbestos Contractor.

PART 2 UTILITIES

2.1 WATER:

- A. When feasible, interrupt the flow of water to areas where asbestos removal shall be conducted. This requirement shall be mandatory in areas of demolition.
- B. The Owner shall furnish access to water required for construction, at no cost to the contractor. The contractor shall be responsible for any plumbing work or fixtures necessary to connect to the Owner's existing system, and shall be required to provide anti-siphon devices at the connection to the Owner's water system.
- C. Contaminated water shall be treated by a several stage filter system consisting minimally of a 25 micron filter followed by a 5 micron filter and typically by a 5 micron, 50 micron and 100 micron filter series prior to disposal in a municipal sewage system. This process may only be used when not contrary to local ordinances.
- D. Coordinate with the Owner for the nearest hookup and drainage. It shall be the contractor's responsibility to connect the water source to the location needed and to provide required drainage.

2.2 ELECTRICITY:

- A. Electricity shall be from the Owner's designated panel box, through the contractor's power board, to the work area. The contractor shall supply the air-monitoring firm with sufficient outlets.
- B. The contractor shall label any circuits disabled in conjunction with the work; "TEMPORARILY DISCONNECTED DUE TO RENOVATION WORK. DO NOT ACTIVATE THESE CIRCUITS – SAFETY HAZARD".
- C. The contractor shall supply a power board on site designed to handle the expected electrical load during the project. The power board shall be installed, tested and activated prior to any other site work for the execution of this contract. This work shall be accomplished by a properly trained and experienced electrician.
- D. Provide as required by 29 CFR 1926, temporary 120/240 Volt, single phase, three wire, 100 amp electric service with Ground Fault circuit Interrupters (GFCI) for electrical requirements for the project. No damaged electrical cords shall be allowed on site. Draw out power service from Owner's existing power panel to service the contractor's power board. Each HEPA unit shall be circuited to a separate and unique breaker with a minimum of 15 amp. service to prevent multiple loss of negative pressure units.
- E. Provide temporary lighting with "weatherproof" fixtures for work areas including the decontamination chambers.
- F. Provide electrical service as needed by the Project Monitor and the AST (including GFCI). Minimum electrical services that are to be provided include:
 - 1. Six 15 amp. protected 3 prong outlets within the work area.
 - 2. Six 15 amp protected 3 prong outlets for work areas outside of the containment zone or area.
 - a. The Owner shall not be responsible for making available to the contractor temporary electrical service systems.
 - b. The contractor shall supply power and connections to maintain fire alarms and security system in non-work areas. The contractor may also be required to provide temporary electrical service to occupied portions of the building.

PART 3 EXECUTION

3.1 WORK AREA PREPARATION

- A. The work area shall be vacated by the occupants prior to work area preparation and until satisfactory clearance air monitoring results have been achieved.
- B. Caution signs meeting the specifications of OSHA 29 CFR 1910.1001(j) shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.
- C. Shut down and lock out electric power to all work areas. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault circuit interrupter at the source.
- D. The personal decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos

material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.

- E. Heating, Ventilating and Air Conditioning (HVAC) System Isolation. Acceptable methods for HVAC system isolation shall include conformance with NYCRR Title 12, Subpart 56-8.
- F. Shutdown and isolation HVAC systems to prevent contamination and asbestos dispersal to other areas of the building or structure.
- G. Contaminated HVAC filters shall be handled and disposed of as asbestos waste material. The ducts and filter assembly shall be wet cleaned and/or HEPA vacuumed where system air samples and/or dust samples indicate asbestos contamination.
- H. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects and items shall be enclosed with two layers of at least six-mil plastic sheeting and sealed with tape.
- I. The work area shall be cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be permitted.
- J. Isolation barriers that seal off all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetrations of the work area shall be constructed using two layers of at least six mil, fire retardant plastic sheeting sealed with tape. Also, all seams in system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.
- K. Separation of the work area from the remainder of the work site by construction of isolation barriers shall be accomplished as follows:
 - 1. Wall shall be constructed of wood or metal framing to support barriers in all openings larger than thirty-two square feet, except where any one dimension is one foot, or less.
 - 2. A sheathing material of at least three-eighths inch thickness shall be applied to the work side of the barrier.
 - 3. Edges of the partition shall be caulked at the floor, ceiling, walls and fixtures to form an airtight seal.
 - 4. The work area side of the partition shall be covered with a double layer of at least six-mil, fire retardant plastic sheathing with staggered joints and sealed.
- L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

3.2 TRANSPORTATION AND DISPOSAL

- A. Applicable Regulations:
 - 1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following regulations:
 - a. NYS DEC 6 NYRCC part 360 and 364
 - b. USEPA NESHAPS 40 CFR 61
 - c. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007
- B. Transportation and Disposal Site:
 - 1. The Contractor's hauler and disposal site shall be subject to the approval of the Project Monitor.
 - 2. The Contractor shall give 24-hour notification prior to removing any waste from the site. Waste shall be removed from site only during normal working hours unless otherwise specified. No waste may be taken from the site without authorization from the Project Monitor.

- C. Prior to the removal of any waste materials from the site, the contractor shall submit a complete and valid copy of an "Industrial Waste Transporter Permit" specifically for asbestos-containing materials, pursuant to 6 NYCRR 364 for the transporting of waste. Only vehicles listed on this permit shall be allowed to transport waste materials from the site.
- D. Waste Shipment Record; Prior to the transport of any waste materials from the site, the contractor shall submit a Waste Shipment Record (WSR) to the Project Monitor with generator and transporter sections completely filled in and signed for each day on which asbestos waste is removed from the site. Provide originally signed WSR to Project Monitor so he can make copies for records and return the originally signed WSR to transporter so that original signature of landfill agent can be entered upon delivery to landfill. This documentation shall include the amount of waste removed, in both numbers of bags or containers, which correspond to the Project Monitor's logged count and cubic yards. The WSR shall include the, name and address of the transporter, the landfill to which the waste is transported, the quantity accepted by the landfill and the signature of the landfill official who accepts the delivery. Waste Shipment Records bearing the original signature (carbon copy bearing impressions of the original signatures are acceptable) of the landfill agent receiving the waste must be received by the Owner/Architect/Certified Project Designer within 35 days of shipment. Failure to comply shall result in a detailed report being transmitted to the New York State Department of Labor and EPA-NESHAPS.

END OF SECTION

SECTION 02 41 00
SELECTIVE STRUCTURAL DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.
- B. Demolishing designated building equipment and fixtures.
- C. Demolishing designated construction.
- D. Removing designated items for Owner retention.
- E. Protecting items designated to remain.
- F. Removing demolished materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- C. Section 01 35 17 - Alteration Project Procedures: Protection of existing facilities; cutting and patching requirements.
- D. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- E. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- F. Section 01 70 00 - 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.
- G. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- H. Section 31 10 00 - Site Clearing: Vegetation and existing debris removal.
- I. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.3 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Site Plan: Indicate:
 - 1. Areas for temporary construction and field offices.

- C. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
 - 1. Indicate extent of demolition, removal sequencing, bracing and shoring, and location and construction of barricades and fences.
 - 2. Demolition firm qualifications.
 - 3. Indicate location of items designated for Owner retention.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.5 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Minimum of ten years of documented experience.
- B. Design shoring, bracing, underpinning under direct supervision of Professional Engineer experienced in design of this Work and licensed the State of New York.
- C. Conform to applicable code for demolition work, safety of adjacent structures, dust control, products requiring electrical disconnection and re-connection.
- D. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.
- E. Obtain required permits from authorities having jurisdiction.

1.6 SEQUENCING

- A. Section 01 10 00 - Summary: Requirements for sequencing.
- B. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 SCHEDULING

- A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.
- B. Schedule work to coincide with new construction.
- C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owner operations.
- D. Performance of noisy, malodorous, dusty, and removal of hazardous material work:
 - 1. Will not be permitted during school hours.
 - 2. All activities must be coordinated with the Owner to ensure that programming and services will be uninterrupted by construction activities and to ensure the safety of the students and occupants.
- E. Coordinate utility and building service interruptions with Owner.
 - 1. Do not disable or disrupt building fire or life safety systems without five days prior written notice to Owner.
 - 2. Schedule tie-ins to existing systems to minimize disruption.
 - 3. Coordinate work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.9 PROJECT CONDITIONS

- A. Buildings indicated to be demolished will be vacated before start of Work.
- B. Owner assumes no responsibility for actual condition of buildings to be demolished.
- C. Hazardous Materials: Known hazardous materials will be removed before start of Work. Notify Architect/Engineer upon discovery of a hazardous material.
- D. Each contractor shall be responsible for the cutting and patching of existing surfaces as required to complete the work of their contract unless noted otherwise.
- E. Conduct demolition to minimize interference with adjacent and occupied building areas.
- F. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.1 DEMOLITION

- A. Within area of new construction, remove foundation walls and footings to minimum 2 feet below finished grade.
- B. Remove concrete slabs on grade as indicated on drawings.
- C. Remove other items indicated, for salvage, relocation, and recycling.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Coordinate demolition sequence and procedures to prevent structures from becoming unstable.
 - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 4. Layout cuts in post-tensioned concrete elements to avoid cutting concrete within 12 inches of any stressing tendon. Notify Architect five days in advance of cutting post-tensioned concrete.
 - 5. Provide, erect, and maintain temporary barriers and security devices.
 - 6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 8. Do not close or obstruct roadways or sidewalks or hydrants without permit.
 - 9. 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.
 - 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.
- E. Protect existing structures and other elements to remain in place and not removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. Verify hazardous material abatement is complete before beginning demolition.
- H. Carefully remove building components indicated to be reused.
 - 1. Mark components and packaged parts to permit reinstallation.
 - 2. Store components, protected from construction operations until reinstalled.
- I. At completion of the demolition work restore, repair or refinish all building systems, components and finishes disturbed as the result of the demolition process.
- J. Remove foundation walls and footings to minimum of two feet below finished grade .

3.3 EXISTING UTILITIES

- A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 - 1. Verify 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 areas that remain occupied.

1. Provide sound retardant partitions of construction and in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
- D. Remove existing work as indicated and required to accomplish new work.
 1. Remove items indicated on drawings.
- E. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
 1. Maintain existing active systems to remain in operation, and 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 as required.
 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch to match new work.

3.5 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Carefully remove building components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal from building.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.6 DEBRIS AND WASTE REMOVAL

- A. Remove materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.
- 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 02 83 13
LEAD HAZARD CONTROL ACTIVITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Summary of labor, materials, services, and equipment necessary for complete removal and disposal of the following demolition debris in accordance with U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the State of New York, and local regulations:
 - 1. Lead-based paint.
 - 2. Lead-containing material.

1.2 DEFINITIONS

- A. Lead-based paint (LBP), as defined by the United States Environmental Protection Agency (USEPA) and the United States Department of Housing and Urban Development (HUD), means paint or other surface coatings that contain lead equal to or greater than 1.0 milligram per square centimeter (mg/cm²) or 0.5% by weight; or 5000 parts per million (ppm) by weight.
- B. Lead, as defined by Occupational Safety & Health Administration (OSHA) 29 CFR 1926.62, means metallic lead, all inorganic lead compounds, and organic lead soaps. All other organic lead compounds are excluded from this definition.
- C. Action Level, as defined by OSHA 29 CFR 1926.62, means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter (30 µg/m³) of air calculated as an 8-hour time-weighted average (TWA).
- D. Permissible Exposure Limit (PEL), as defined by OSHA 29 CFR 1926.62, means employee exposure, without regard to personal protective equipment, to an airborne concentration of lead of 50 µg/m³ (calculated as a TWA).
- E. Competent person, as defined by 29 CFR 1926.62, means one who is capable of identifying lead hazards and implementing corrective measures to eliminate hazards.
- F. Lead-containing material (LCM) includes LBP, lead-containing components / surfaces, and ceramic tile / ceramic block applications. A building material is defined as an LCM if any detectable amount of lead is present in that building material.

1.3 REFERENCE STANDARDS

- A. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- B. 29 CFR 1910.134 - Respiratory protection; current edition.
- C. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- D. 29 CFR 1926.62 - Lead; current edition.
- E. 40 CFR - U.S. Code of Federal Regulations; Title 40 - Protection of Environment; current edition.
- F. NYSDEC Regulations - 6 NYCRR, Chapter IV, current edition.

1.4 SUMMARY OF WORK

- A. All painted surfaces / building materials are presumed to contain lead and shall be treated as LCM on this project. Upon request, the Contractor may review available survey reports for additional details pertaining to LCM (including LBP) identified at the project site.
- B. Activities that will disturb LCM shall comply with the conditions specified herein. The OSHA regulates occupational exposure to lead under 29 CFR 1926.62, Lead in Construction Standard. Any Contractor disturbing LCM shall comply with all the requirements of 29 CFR 1926.62 and this specification. The intent is for the Contractor to protect their workers and building occupants from unnecessary exposures to lead.
- C. The Contractor shall provide all labor, materials, tools, and equipment necessary to protect both workers and building occupants from potential lead exposure.
- D. Any waste products shall be considered industrial or hazardous waste, based on the results of a Toxicity Characteristic Leaching Procedure (TCLP) test. The cost of this testing shall be the sole responsibility of the Contractor and included in their bid for the project.
- E. Exact quantities and locations of LCMs that will be disturbed shall be determined by the Contractor at the time of bid. The Contractor must be satisfied as to the quantity of wastes requiring transport & disposal, and include all such costs in their bid price.
- F. All work shall be performed in accordance with this specification and applicable federal, state, and/or local regulations. Dry sweeping of lead-containing dust is prohibited. Lead-containing debris shall be removed and collected using high efficiency particulate air (HEPA) vacuums designed to collect waste including paint chips, debris, and dust.
- G. It is the Contractor's responsibility to ensure that waste materials are contained, transported, and disposed of in accordance with all applicable federal, state, and local regulations.

1.5 APPLICABLE REGULATIONS

- A. The Contractor shall comply with all federal, state, and local laws, ordinances, rules, and regulations regarding the handling, storage, and disposal of LCM. The Contractor is further responsible to conduct work in compliance with all applicable codes, rules, laws, and regulations including, but not limited to:
 - 1. Worker Protection - Occupational Safety and Health Administration (OSHA)
 - a. 29 CFR 1910.134 - Respiratory Protection Standard
 - b. 29 CFR 1926 Subpart C - General Safety and Health Provisions
 - c. 29 CFR 1926.59 - Hazard Communication
 - d. 29 CFR 1926.62 - Lead Exposure in Construction
 - e. 29 CFR 1910.94 and 29 CFR 1926.57 - Ventilation
 - 2. Ambient Air Quality - Environmental Protection Agency (EPA)
 - a. 40 CFR Part 50.6 - National Primary and Secondary Ambient Air Quality Standards for Particulate Matter
 - 3. Water Quality - Environmental Protection Agency (EPA)
 - a. 40 CFR Part 122 - Administered Permit Programs; The National Pollutant Discharge Elimination System
 - 4. Waste Disposal - Environmental Protection Agency (EPA)
 - a. 40 CFR Part 261 - Identification and Listing of Hazardous Waste
 - b. 40 CFR Part 262 - Standards Applicable to Generators of Hazardous Waste
 - c. 40 CFR Part 263 - Standards Applicable to Transporters of Hazardous Waste
 - 5. New York State Department of Environmental Conservation (NYSDEC)
 - a. 6 NYCRR; Chapter IV; Parts 360.7, 364, and 370 through 374
- B. The Contractor shall comply with the following regulatory agencies and guidance documents:
 - 1. U.S. Department of Labor.

2. Occupational Safety and Health Administration Pub. 3126 - Working with Lead in the Construction Industry.
3. USEPA Lead Renovation, Repair and Painting (RRP) Program.

1.6 LEAD HAZARDS

- A. Work practices / methods that may release lead dust or fumes into the air and onto surrounding surfaces are prohibited. It is the Contractor's responsibility to reduce potential exposure to lead.
- B. Lead is a toxic substance, which travels into the body by inhalation or ingestion due to lead dust and/or fumes that are present. Upon entering the body, lead enters the bloodstream, traveling throughout the body. The body cannot eliminate all of the lead; therefore, it is stored in tissue and organs. Stored quantities of lead may cause irreversible damage to cells, organs, and body systems.
- C. Exposure to lead may affect individuals differently. Exposure may occur without any indication of exposure or symptoms developing. Symptoms of lead poisoning to be aware of include, but are not limited to, loss of appetite, trouble sleeping, irritability, fatigue, headache, joint and muscle ache, metallic taste, decreased sex drive, lack of concentration, and moodiness.
- D. Prolonged exposure may result in damage to the body's systems including nervous, reproductive and circulatory systems. Symptoms of such exposures may include, but are not limited to, stomach pains, high blood pressure, nausea, tremors, seizures, anemia, constipation, and convulsions.
- E. The Contractor's Supervisor is responsible to monitor any workers for such symptoms and is further responsible for ensuring affected workers are removed from the area. Affected workers shall not return until such time that the requirements outlined in the OSHA Lead in Construction Standard (29 CFR 1926.62) have been met.

1.7 GENERAL REQUIREMENTS

- A. The Contractor is responsible for complying with the following general requirements applicable to the project (at a minimum):
 1. Respiratory Protection and personal protection.
 2. Medical examinations.
 3. Utilization of engineering controls, as necessary, to reduce potential exposure.
 4. Proper clean up and disposal of all lead-related waste materials, as required.
- B. The Contractor is solely responsible for properly protecting their workers. Additional safety measures beyond OSHA requirements are encouraged, but are at the implementation and discretion of the Contractor.

1.8 SUBMITTALS

- A. Pre-Abatement Submittals. The Contractor shall submit the following information to the Project Architect and Project Designer at least ten (10) business days prior to starting the work:
 1. Work Plan - The Contractor shall submit a work plan in compliance with the requirements of the OSHA Lead in Construction Standard (29 CFR 1926.62). The plan shall include but is not limited to: handling, cleaning, containerizing, transport, and disposal.
 2. Equipment - Information for all equipment utilized shall be submitted for review prior to commencement of project activities. This includes, but is not limited to: equipment specifications and safety data sheets (SDS).
 3. Training - The Contractor shall provide proof of Lead Awareness Training in accordance with OSHA 29 CFR 1926.62 for all employees performing renovation / repair activities resulting in the disturbance of LCMs.

4. Disposal - The Contractor shall submit documentation including all required permits, anticipated disposal facilities, and anticipated transporter information should construction waste be determined to be hazardous. If applicable, copies of applicable laboratory credentials shall be provided for the laboratory performing TCLP analysis.
- B. Post-Abatement / Closeout Submittals. The following information shall be transmitted to the Project Architect and Project Designer within thirty (30) business days following completion of all renovation activities:
 1. Copies of all OSHA personal / employee lead exposure assessment air sampling data collected during the course of the renovation project.
 2. Copies of waste manifests / disposal documentation associated with any LCM waste removed from the project.
 3. Any other documentation requested by the Owner or Owner's Representatives.

1.9 PERSONAL AIR SAMPLING & ANALYSIS

- A. The Contractor is responsible for conducting personal lead exposure assessment air monitoring of their employees, as required by OSHA 29 CFR 1926.62. Personal air samples shall be collected which are representative of a full-shift including at least one sample for each job classification in each work area either for each shift or for the shift with the highest exposure level. Full-shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.
- B. If requested by the Building Owner or Consultant, the Contractor shall provide laboratory analysis reports showing that they are conducting personal lead exposure assessment air monitoring of employees working with lead in accordance with OSHA 29 CFR 1926.62.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Solutions – The Contractor shall utilize a lead-specific cleaning solution for all cleaning activities. The cleaning solution shall be an approved solution that does not contain tri-sodium phosphate (TSP).
- B. Plastic Sheeting - To prevent dust migration during renovation / demolition activities, the Contractor shall utilize dust barriers, containments, and/or enclosures constructed of 6-mil fire-retardant plastic sheeting. These barriers shall be constructed to minimize dust migration into adjacent non-work areas.
- C. Framing - If framing is utilized for the construction of dust barriers / containments, the Contractor shall utilize reinforcement framing / sheathing materials that are at least 1/2-inch thick. Minimum requirements for framing materials shall be comprised of 2"x4" stud framing in accordance with all applicable building and fire codes.
- D. Adhesives – The Contractor shall utilize commercially available duct tape and spray adhesives designed for such purposes to maintain the integrity of barriers, containments, and enclosures.

2.2 EQUIPMENT

- A. Protective Clothing – Contractor shall provide their employees with coveralls, gloves, eye protection, ear protection, safety footwear, hard hats, fall protection etc. as required per applicable OSHA regulations.
- B. Respiratory Protection - The Contractor shall provide their workers with adequate respiratory protection based upon the lead hazards present during each respective work task being

performed. The level of respiratory protection shall be determined through personal exposure assessment air monitoring.

- C. Respirator Filters - The Contractor shall provide their workers with appropriate respirator filters for the respiratory protection the workers are utilizing as per OSHA 29 CFR 1910.134.

PART 3 - EXECUTION

3.1 LEAD COMPLIANCE PLAN

- A. The Contractor is required to establish and follow a lead compliance plan for the entire renovation project. The requirements, as outlined in OSHA 29 CFR 1926.62, include written procedures for construction activities with regard to control methods and engineering controls.
- B. If the Contractor fails to follow their lead compliance plan, the Owner reserves the right to hire a third-party Environmental Consultant to oversee the Contractor's work. The cost for the third-party Environmental Consultant shall be borne by the Contractor.

3.2 SIGNAGE

- A. Warning signs shall be posted where the potential for any lead exposure exists.
- B. Signs shall remain in place until renovation / demolition activities have been completed and the renovation area has been satisfactorily cleaned.
- C. All signage shall comply with OSHA 29 CFR 1926.62.

3.3 WORK METHODS

- A. The Contractor shall select work methods in compliance with OSHA 29 CFR 1926.62. All work shall be performed utilizing wet methods and other engineering controls, as necessary.
- B. The Contractor is prohibited from dry methods of removal, heat gun applications, mechanical methods (grinding/sanding), and/or torch-cutting during renovation / demolition activities.

3.4 CLEANING & CLEARANCE

- A. Following the completion of all lead-related work activities, all surfaces within and 25 feet beyond the areas impacted by the renovation work shall be cleaned of all visible paint chips, dust, and debris.
- B. Visual examinations / inspections of all areas affected by the lead-related work shall be conducted by the Contractor's Supervisor to determine satisfactory cleaning of all affected areas; however, the Owner reserves the right to retain a third-party consultant to perform visual clearance inspections and/or perform lead dust wipe sampling to determine satisfactory cleaning and satisfactory completion of the work.
- C. If the Contractor does not satisfactorily clean an area based on visual examinations or if lead dust-wipe sampling results are unacceptable, the affected areas shall be re-cleaned by the Contractor at their own expense. The cost for re-cleaning, third-party consultant oversight, and additional sampling/testing associated with re-cleaning activities shall be borne by the Contractor.

3.5 WASTE TRANSPORTATION & DISPOSAL ACTIVITIES

- A. The Contractor is responsible for proper waste characterization sampling and laboratory analysis of LCM, prior to any waste transportation and disposal activities. Waste materials

include, but are not limited to, the following: personal protective equipment, plastic sheeting, signage, barrier tape, cleaning materials, LBP components, and associated building materials classified as LCM.

- B. The Contractor is responsible to coordinate interim storage of waste containers at the site with the Owner and Owner's Representatives while awaiting waste characterization laboratory results.
- C. Lead paint chips and lead paint debris shall not be co-mingled with construction and demolition (C+D) debris. Failure to do so may result in the Contractor having to pay the associated fees for co-mingled lead waste disposal at no additional cost to the Owner.

END OF SECTION

SECTION 03 01 00
MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cleaning of existing concrete surfaces.
- B. Repair of exposed structural, shrinkage, and settlement cracks.
- C. Resurfacing of concrete surfaces having spalled areas and other damage.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

1.3 REFERENCE STANDARDS

- A. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- B. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.
- C. ASTM C928/C928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Material for Concrete Repairs; 2013.
- D. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.
- E. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

- A. Detergent: Non-ionic detergent.

2.2 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

- A. Bonding Slurry: Water-based latex admixture; comply with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.
- B. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.
 - 1. In-place material resistant to freeze/thaw conditions.
 - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
 - 3. Integral corrosion inhibitor.
 - 4. Recommended Thickness: Feather edge to 1/8 inch.
 - 5. Manufacturers:
 - a. Euclid Chemical Company; THIN TOP SUPREME: www.euclidchemical.com/#sle.
 - b. SILPRO Corporation; Raeco Skimwall: www.silpro.com/#sle.
 - c. SpecChem, LLC; Duo Patch: www.specchemllc.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
 - 1. In-place material resistant to freeze/thaw conditions.
 - 2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
 - 3. Integral corrosion inhibitor.
 - 4. Manufacturers:
 - a. Euclid Chemical Company; EXPRESS REPAIR: www.euclidchemical.com/#sle.
 - b. Euclid Chemical Company; EucoRepair V100: www.euclidchemical.com/#sle.
 - c. SpecChem, LLC; RepCon V/O: www.specchemllc.com/#sle.
 - d. SpecChem, LLC; Duo Patch: www.specchemllc.com/#sle.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Pre-Blended Concrete Mix for Small Projects: Construction-grade Portland cement uniformly blended with aggregates and other approved concrete ingredients, requiring only the addition of water.
 - 1. Compressive Strength: 4000 pounds per square inch, minimum, at 28 days, when tested in accordance with ASTM C39/C39M.

2.3 EPOXY PATCHING AND REPAIR MATERIALS

- A. Epoxy Repair Mortar: Epoxy resin mixed with aggregate and other materials in accordance with manufacturer's instructions for purpose intended; comply with pot life and workability limits.
 - 1. Manufacturers:
 - a. ARDEX Engineered Cements; ARDEX BACA: www.ardexamericas.com/#sle.
 - b. Kaufman Products Inc; SurePoxo Mortar, SurePoxo HMLV, or SurePoxo HMLV Class B: www.kaufmanproducts.net/#sle.
 - c. SpecChem, LLC; SpecPoxo 1000, SpecPoxo 2000, SpecPoxo 3000 or SpecPoxo 3000 FS: www.specchemllc.com/#sle.

- d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Epoxy Injection Adhesive:
 - 1. Manufacturers:
 - a. Adhesives Technology Corporation; CRACKBOND LR-321 LV: www.atcepoxy.com/#sle.
 - b. Kaufman Products Inc; SurePoxy HM, SurePoxy HMLV, SurePoxy HMLV Class B, or SurePoxy HMSLV: www.kaufmanproducts.net/#sle.
 - c. SpecChem, LLC; SpecPoxy 1000; www.specchemllc.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Epoxy Bonding Adhesive: Non-sag, two-component, 100 percent solids; recommended by manufacturer for purpose and conditions under which used.
 - 1. Load-Bearing Applications: ASTM C881/C881M Type IV or V, whichever is appropriate to application.
 - 2. Manufacturers:
 - a. Adhesives Technology Corporation; CRACKBOND 2100 MV: www.atcepoxy.com/#sle.
 - b. Kaufman Products Inc; SurePoxy HM Gel: www.kaufmanproducts.net/#sle.
 - c. Pecora; Dynapoxy Low-Mod Epoxy: www.pecora.com/#sle.
 - d. SpecChem, LLC; SpecPoxy 3000 FS: www.specchemllc.com/#sle.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Epoxy Grout: Two-component, 100 percent solids; recommended by manufacturer for purpose and conditions under which used.
 - 1. Load-Bearing Applications: ASTM C881/C881M, Type IV or V, whichever is appropriate to application.

2.4 ACCESSORIES

- A. Anchoring Adhesive: Self-leveling or non-sag as applicable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

- A. Prepare concrete surfaces to be repaired according to ICRI 310.2R.

3.3 CLEANING EXISTING CONCRETE

- A. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
 - 1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
 - 2. Clean out cracks and voids using same methods.
- B. The following are acceptable cleaning methods, in order from gentlest to less gentle:
 - 1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.
 - 2. Increasing the water washing pressure to maximum of 400 psi.

3. Adding detergent to washing water; with final water rinse to remove residual detergent.
4. Steam-generated low-pressure hot-water washing.

3.4 CRACK REPAIR USING EPOXY ADHESIVE INJECTION

- A. Repair exposed cracks.
- B. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than the depth of the crack to be filled or port size diameter no greater than the thickness of the crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.
- C. Inject adhesive into ports under pressure using equipment appropriate for particular application.
- D. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.
- E. Remove temporary seal and excess adhesive.
- F. Clean surfaces adjacent to repair and blend finish.

3.5 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

- A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.
- B. Apply coating of bonding agent to entire concrete surface to be repaired.
- C. Fill voids with cementitious mortar flush with surface.
- D. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch over entire surface, terminating at a vertical change in plane on all sides.
- E. Trowel finish to match adjacent concrete surfaces.

3.6 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. An independent testing agency, as specified in Section 01 40 00, will perform field inspection and testing.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete formwork.
- B. Concrete for composite floor construction.
- C. Elevated concrete slabs.
- D. Floors and slabs on grade.
- E. Concrete foundation walls.
- F. Concrete reinforcement.
- G. Joint devices associated with concrete work.
- H. Miscellaneous concrete elements, including equipment pads.
- I. Concrete finishing.
- J. Concrete curing.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealant: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- B. Section 32 13 13 - Concrete Paving: Sidewalks, curbs and gutters.

1.3 REFERENCE STANDARDS

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).
- D. ACI 301 - Specifications for Structural Concrete; 2016.
- E. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
- F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- G. ACI 305R - Guide to Hot Weather Concreting; 2010.
- H. ACI 306R - Guide to Cold Weather Concreting; 2016.
- I. ACI 308R - Guide to External Curing of Concrete; 2016.
- J. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- K. ACI 347R - Guide to Formwork for Concrete; 2014, with Errata (2017).

- L. ACI SP-66 - ACI Detailing Manual; 2004.
- M. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- N. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- O. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2017.
- P. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2019.
- Q. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- R. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- S. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2019a.
- T. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- U. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- V. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- W. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- X. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- Y. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- Z. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2017a.
- AA. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- AB. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.
- AC. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2017.
- AD. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.
- AE. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.
- AF. ASTM C 1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete, 2017.
- AG. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2010a (Reapproved 2015).
- AH. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015.
- AI. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- AJ. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.

- AK. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 2014.
- AL. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric); 2014.
- AM. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.
- AN. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products such as joint devices, attachment accessories, and admixtures, showing compliance with specified requirements.
 - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
- D. Design Data:
 - 1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
 - a. Hot and cold weather concrete work.
 - b. Air entrained concrete work.
 - 2. Identify mix ingredients and proportions, including admixtures.
 - 3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
 - 4. Submit 28 day concrete strength test data for each mix design per ACI 318 requirements.
 - a. Provide a minimum of 15 concrete strength tests, where a concrete strength test is the average strength of at least two 6x12 inch or three 4x8 inch cylinders.
 - b. If 15 concrete tests are unavailable, the average strength of the concrete tests must exceed the required strength by 1200psi for up to 5000 psi mix concrete.
- E. Samples: Submit samples of underslab vapor retarder to be used.
- F. Reinforcing Placement Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices, supporting & spacing devices. Indicate quantities of reinforcing steel and welded wire fabric.
- G. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- H. Reports: Submit certified copies of mill test report of reinforcement materials analysis.
- I. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.
- J. Test Reports: Submit report for each test or series of tests specified.
- K. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution & Closeout Requirements.

- B. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.
 - 1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
 - 2. Provide warranty by admixture manufacturer matching terms of flooring adhesive or primer manufacturer's material defect warranty.

1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
 - 2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
 - 3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 - 4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.2 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Type: Deformed billet-steel bars.
2. Finish: Unfinished, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
 1. Form: Flat Sheets.
 2. WWR Style: As indicated on drawings.
- C. Reinforcement Accessories:
 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.
- D. Fiber Reinforcement: Alkali-resistant polypropylene monofilament complying with ASTM C1116/C1116M, 24 ksi minimum tensile strength. Mixing rate per manufacturer's recommendations.
 1. Fiber Length: 0.75 inch, nominal.
 2. Products:
 - a. Fibermesh 150 by Propex Concrete Systems: www.fibermesh.com
 - b. FRC Mono 150 by FRC Industries: www.frcindustries.com
 - c. ECONO-MONO by Forta Corporation: www.forta-ferro.com
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 1. Acquire aggregates for entire project from same source.
 2. Coarse Aggregate Maximum Size: In accordance with ACI 318
- C. Lightweight Aggregate: ASTM C330/C330M.
- D. Fly Ash: ASTM C 618, Class F. Loss on ignition requirement waived if used in flowable fill concrete mix.
- E. Water: ACI 318; Clean and not detrimental to concrete.

2.4 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Accelerating Admixture: ASTM C494/C494M Type C.
- H. Retarding Admixture: ASTM C494/C494M Type B.
- I. Water Reducing Admixture: ASTM C494/C494M Type A.

- J. Moisture Vapor Reducing Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs). Closes capillary systems formed during concrete curing to reduce moisture vapor emission and transmission. Reduces concrete shrinkage with no adverse effect on concrete properties or applied flooring.
1. Provide admixture in slabs to receive adhesively applied flooring or roofing.
 2. Products:
 - a. Barrier One, Inc; Barrier One Moisture Vapor Reduction Admixture: www.barrierone.com.
 - b. ISE Logik Industries, Inc; MVRA 900: www.iselogik.com/#sle.
 - c. Specialty Products Group; Vapor Lock 20/20: www.spgogreen.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

2.5 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 2. Products:
 - a. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com/#sle.
 - b. Poly-America; Husky Yellow Guard 15-mil Vapor Barrier: www.yellowguard.com/#sle.
 - c. Stego Industries, LLC; Stego Wrap 15-mil: www.stegoindustries.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.
 2. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.
 3. Flowable Products:
 - a. Euclid Chemical Company; NS GROUT: www.euclidchemical.com/#sle.
 - b. Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarprouducts.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
1. Minimum Compressive Strength at 7 days, ASTM D695: 12,000 pounds per square inch.

2.6 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
1. Complying with ASTM C881/C881M and of Type required for specific application.
 2. Products:
 - a. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
 - b. Kaufman Products Inc; SurePoxy HM Class B: www.kaufmanproducts.net/#sle.
 - c. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000, or SpecPoxy 3000FS: www.specchemllc.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
 - 1. Material: ASTM D1751, Nonextruding, resilient asphalt impregnated fiberboard or felt.
- D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
 - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
 - 2. Height: To suit slab thickness.

2.7 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
- B. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
- C. Moisture-Retaining Sheet: ASTM C171.
 - 1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
 - 2. Non-staining cotton fabric, weighing not less than 8 oz/per square yd, bonded to prevent separation during handling and placing.
- D. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.
- E. Water: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.
- C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- E. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- F. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Water-Cement Ratio: As indicated on drawings.
 - 4. Total Air Content: 5 +/- 1.5 percent, determined in accordance with ASTM C173/C173M.
 - 5. Maximum Design Slump: 4 inches prior to the addition of admixtures.
 - 6. Maximum Aggregate Size: 3/4 inch.
- G. Structural Lightweight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Water-Cement Ratio: As indicated on drawings.
 - 3. Maximum Aggregate Size: 3/4 inch.
 - 4. Maximum dry unit weight: 115 pound per cubic foot.

2.9 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
 - 1. Fiber Reinforcement: Batch and mix as recommended by manufacturer for specific project conditions.
- B. Transit Mixers: Comply with ASTM C94/C94M.
- C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.
- D. Do not use shrinkage-reducing admixture (SRA) in same concrete batch with MVRA or PIA.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- C. Remove water from areas receiving concrete before concrete is placed.
- D. Verify that forms are clean and free of rust before applying release agent.
- E. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- F. Wet sticking anchor rods shall not be permitted.
- G. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions. Remove laitance, coatings & unsound materials.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
 - 2. Use latex bonding agent only for non-load-bearing applications.
- H. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- I. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.
 - 2. Lap Vapor Barrier over footings and seal to foundation walls.

3. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
4. Seal all penetrations (including pipes) with pipe boot and tape.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.4 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Notify testing laboratory and Architect not less than 24 hours prior to commencement of placement operations.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.5 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
- E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.
- F. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
- G. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.
- H. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- I. Install joint covers in longest practical length, when adjacent construction activity is complete.
- J. Apply sealants in joint devices in accordance with Section 07 92 00.
- K. Deposit concrete at final position. Prevent segregation of mix.
- L. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- M. Consolidate concrete.
- N. Place concrete continuously between predetermined expansion, control, and construction joints.
- O. Do not interrupt successive placement; do not permit cold joints to occur.

- P. Place floor slabs in checkerboard or saw cut pattern indicated.
- Q. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
- R. Screed floors level, maintaining the following minimum F(F) Floor Flatness and F(L) Floor Levelness values when measured in accordance with ASTM E1155.

3.6 SEPARATE FLOOR TOPPINGS

- A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.
- B. Place required dividers, edge strips, reinforcing, and other items to be cast in.
- C. Apply bonding agent to substrate in accordance with manufacturer's instructions.
- D. Place concrete floor toppings to required lines and levels.
 - 1. Place topping in checkerboard panels not to exceed 20 feet in either direction.
- E. Screed toppings level, maintaining surface flatness of maximum 1/8 inch in 10 feet.

3.7 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for compliance with specified tolerances.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
 - 1. Exposed to View and Foot Traffic: F(F) of 35; F(L) of 25, on-grade only.
 - 2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
 - 3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
 - 4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.8 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
 - 2. Parge coating is not acceptable.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects. Broom finish exterior slabs on grade.

- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/4 inch per foot nominal if not indicated on the drawings.

3.9 CURING

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.10 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318 and applicable code.
- C. Provide free access to concrete operations at project site and cooperate with appointed firm.
- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- E. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- F. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172/C172M.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured.
 - 3. Sample concrete and make one set of four cylinders for every 50 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
 - 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 - 5. Make one additional cylinder during cold weather concreting, and field cure.
- G. Field Testing:
 - 1. Slump Test Method: ASTM C143/C143M.
 - 2. Air Content Test Method: ASTM C173/C173M.
 - 3. Temperature Test Method: ASTM C1064/C1064M.
 - 4. Measure slump and temperature for each compressive strength concrete sample.
 - 5. Measure air content in air entrained concrete for each compressive strength concrete sample.
- H. Cylinder Compressive Strength Testing:
 - 1. Test Method: ASTM C39/C39M.
 - 2. Test Acceptance: In accordance with ACI 318 and applicable code.
 - 3. Test one cylinder at 7 days.
 - 4. Test two cylinders at 28 days.
 - 5. Retain one cylinder for 56 days for testing when requested by Architect.
 - 6. Dispose remaining cylinders when testing is not required.
- I. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

- J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.11 PATCHING

- A. Allow Architect to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
- C. Patch imperfections as directed by Architect in accordance with ACI 318.

3.12 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.13 PROTECTION

- A. If cold weather provisions of ACI 306R are required:
 - 1. Protect fresh concrete from freezing by heating the ground and forms to minimum temperatures of ACI 306R.
 - 2. Thermally protect the fresh concrete the following durations
 - a. Concrete footings/walls - 48 hours after placement
 - b. Concrete piers - 72 hours after placement.
 - c. Concrete slabs on grade - 72 hours after placement.
- B. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 03 54 00
CAST UNDERLAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Liquid-applied self-leveling floor underlayment.
 - 1. Use cementitious type at all locations.

1.2 RELATED REQUIREMENTS

- A. Section 01 70 00 - Execution and Closeout Requirements: Alteration project procedures; selective demolition for remodeling.
- B. Section 03 30 00 - Cast-in-place Concrete

1.3 REFERENCE STANDARDS

- A. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- B. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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, mixing instructions, environmental limitations, and installation instructions.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Instructions.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with minimum three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section, and approved by manufacturer.

1.6 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.

1.7 FIELD CONDITIONS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.

- B. Maintain minimum ambient temperatures of 50 degrees F 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

2.1 MANUFACTURERS

- A. Cementitious Underlayment:
 - 1. ARDEX Engineered Cements; ARDEX V 1200 with ARDEX P51 Primer: www.ardexamericas.com/#sle.
 - 2. CMP Specialty Products; Level-1 with AS-100 Primer: www.cmpsp.com
 - 3. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
 - 4. Sika Corporation; Product Sikafloor Level 50. www.sikaconstruction.com

2.2 MATERIALS

- A. Cast Underlayments, General:
 - 1. Comply with applicable code for combustibility or flame spread requirements.
- B. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
 - 1. Flexural Strength: Minimum 1000 psi after 28 days, tested per ASTM C348.
 - 2. Density: 125 pounds per cubic foot, nominal.
 - 3. Final Set Time: 1-1/2 to 2 hours, maximum.
 - 4. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
 - 5. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E 84.
- C. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch 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.

2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Add aggregate for areas where thickness will exceed 1 inch or as required per product manufacturer. 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

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.2 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.

3.3 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Pump or pour material onto substrate. Do not retemper or add water.
 - 1. Pump, move, and screed while the material is still highly flowable.
 - 2. Be careful not to create cold joints.
 - 3. Wear spiked shoes while working in the wet material to avoid leaving marks.
- C. Place to thickness indicated on Drawings or as required to achieve finished floor elevation, with top surface level to 1/16 inch in 10 ft.
- D. For final thickness over 1-1/2 inches, 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.
- E. Place before partition installation.
- F. 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.
- G. If a fine, feathered edge is desired, initial preparation per manufacturers recommendations and steel trowel the edge after initial set, but before it is completely hard.

3.4 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.

3.5 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field inspection and testing, as specified in Section 01 40 00 - Quality Requirements.
- B. Placed Material: Agency will inspect and test for compliance with specification requirements.

3.6 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 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block.
- B. Common brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Control
- B. Section 07 92 00 - Joint Sealant: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2018.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- F. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016.
- G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- H. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.
- I. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.
- J. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- K. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- L. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.

- M. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2018a.
- N. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- O. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- P. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2018a.
- Q. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- R. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.
- S. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- T. MSJC (Masonry Standards Joint Committee) Code - ACI (American Concrete Institute) 530/ASCE (American Society of Civil Engineers) 5/TMS (The Masonry Society) 402 - Building Code Requirements for Masonry Structures.
- U. MSJC (Masonry Standards Joint Committee) Specification - ACI (American Concrete Institute) 530.1/ASCE (American Society of Civil Engineers) 6/TMS (The Masonry Society) 602 - Specifications For Masonry Structures.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
 - 1. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
 - 2. Include the design engineer's stamp or seal on each sheet of shop drawings.
- D. Samples: Submit two samples of facing brick units to illustrate color, texture, and extremes of color range. Brick must match the range of color and texture of the existing brick or as selected by Architect.
- E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- F. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- G. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

1.6 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Perform Work in accordance with MSJC Code and MSJC Specification.

- C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.7 MOCK-UPS

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Handle and store pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Manufacturers:
 - 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - a. Southern Tier Concrete Products.
 - b. Dagostino Building Blocks.
 - c. York Building Products, Inc.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
- B. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners.
 - a. Provide bullnose units for outside corners.
 - 3. Load-Bearing Units: ASTM C90, normal weight.
 - 4. Nonloadbearing Units: ASTM C129.

2.2 BRICK UNITS

- A. Manufacturers:
 - 1. Belden Brick: www.beldenbrick.com/#sle.
 - 2. Glen-Gery Brick
 - 3. Sioux City Brick & Tile Company
- B. Building (Common) Brick: ASTM C62, Grade SW; solid units.
- C. Type 1: Classroom blend and other existing areas. Match existing blend. Submit samples for custom blend selection.
- D. Type 2 - Fitness Center blend. Match existing blend. Submit samples for custom blend selection.

- E. Nominal size: As indicated on drawings.
 - 1. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

2.3 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Water: Clean and potable.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - 2. WIRE-BOND www.wirebond.com/#sle.
- B. Reinforcing Steel: Type specified in Section 03 30 00; size as indicated on drawings; uncoated finish.
- C. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss or ladder.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- E. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- F. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M, Class B.
- G. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.

2.5 FLASHINGS

- A. Metal Flashing Materials:
 - 1. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gauge, 0.0187 inch thick; finish 2B to 2D.
- B. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.

- C. Stainless Steel/Polymer Fabric Flashing - Self-adhering: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that has a clear adhesive with a removable release liner.

2.6 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
- D. Weeps:
 - 1. Type: Extruded propylene with honeycomb design.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - 2) WIRE-BOND: www.wirebond.com/#sle.
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.
- E. Cavity Vents:
 - 1. Type: Extruded propylene with honeycomb design.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - 2) WIRE-BOND: www.wirebond.com/#sle.
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.
- F. Drainage Fabric: Polyester or polypropylene mesh bonded to a water and vapor-permeable fabric.
- G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. All material cleaning shall be done as recommended by material supplier.

2.7 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior, loadbearing masonry: Type N.
 - 3. Exterior, non-loadbearing masonry: Type N.
 - 4. Interior, loadbearing masonry: Type N.
 - 5. Interior, non-loadbearing masonry: Type O.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running, unless shown otherwise in contract documents.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running and Herringbone, unless shown otherwise in contract documents.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

3.6 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor retarder adhesive.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.
- D. Install cavity wall vents in veneer at 16 inch o.c. horizontally at top of exterior walls and below windowsills.

3.7 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.8 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

- A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties spaced as indicated on drawings.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

3.9 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at nonmasonry construction.
- B. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

3.10 LINTELS

- A. Install loose steel lintels over openings.

- B. Maintain minimum 6 inch bearing on each side of opening.

3.11 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web unless noted otherwise on contract documents.
- B. Lap splices minimum 48 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.12 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Form expansion joint as detailed on drawings.

3.13 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.14 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and ductwork. Coordinate with other sections of work to provide correct size, shape, and location.

- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
 - 1. The agency shall monitor the proportioning, mixing, and consistency of mortar and grout; the placement of mortar, grout and masonry units; and the placement or reinforcing steel for compliance with the contract documents.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.
- E. The agency shall prepare one set of prisms for testing at 7 days and one set for testing at 28 days. Tests are to be conducted by the agency for each 3,000 square feet of wall installed, but not less than two tests.

3.17 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.18 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- B. Protect base of walls from mud and mortar splatter.
- C. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.
- D. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

SECTION 04 72 00
CAST STONE MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Architectural cast stone.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.
- B. Section 07 92 00 - Joint Sealant: Sealing joints indicated to be left open for sealant.

1.3 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2016.
- D. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2014.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- F. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- G. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- H. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- I. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- J. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
 - 1. Include one copy of ASTM C1364 for Architect's use.
- C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- D. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.
- E. Provide signed and sealed calculations by engineer registered in the State of New York for all cast stone anchors for review.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.

1.6 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
 - 1. Approved mock-up will become standard for appearance and workmanship.
 - 2. Mock-up may remain as part of the completed work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Number each piece individually to match shop drawings and schedule.
- C. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- F. Store mortar materials where contamination can be avoided.
- G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

1.8 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Maintain records and quality control program during production of cast stone units. Make records available upon request.
- C. Test and analyze three random specimens for each 500 cubic feet of fabricated cast stone units:
 - 1. Compressive Strength: In accordance with ASTM C1194.
 - 2. Cold Water Absorption: In accordance with ASTM C1195.
- D. Inspect and test for color variation.
- E. Visually inspect color differences between fabricated units and approved sample in accordance with ASTM D1729.
- F. Make completed cast stone available for inspection at manufacturer's factory prior to packaging for shipment. Notify Owner at least seven days before inspection is allowed.
- G. Allow witnessing of factory inspections and test at manufacturer's test facility. Notify Owner at least seven days before inspections and tests are scheduled.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Any current producer member of the Cast Stone Institute.
 - 2. RockCast, Division of Reading Rock Inc.
 - 3. Continental Cast Stone Manufacturing Co.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
 - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
 - 2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
 - 3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
 - 4. Color: Selected by Architect from manufacturer's full range.
 - 5. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
 - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
 - 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.

2.3 MATERIALS

- A. Portland Cement: ASTM C150/C150M.
 - 1. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Admixtures: ASTM C494/C494M.
- E. Water: Potable.
- F. Reinforcing Bars: ASTM A615/A615M, Grade 40 (40,000 psi), deformed bars, galvanized.
 - 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- G. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
- H. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.

- I. Mortar: Portland cement-lime, ASTM C 270, Type N; do not use masonry cement.
- J. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.
- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
 - 1. Drench cast stone components with clear, running water immediately before installation.
 - 2. Set units in a full bed of mortar unless otherwise indicated.
 - 3. Fill vertical joints with mortar.
 - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

3.3 TOLERANCES

- A. Joints: Make all joints 3/8 inch, except as otherwise detailed.
 - 1. Rake mortar joints 3/4 inch for pointing.
 - 2. Remove excess mortar from face of stone before pointing joints.
 - 3. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
 - 4. Leave the following joints open for sealant:
 - a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
 - b. Joints in projecting units.
 - c. Joints between rigidly anchored units, including soffits, panels, and column covers.
 - d. Joints below lugged sills and stair treads.
 - e. Joints below ledge and relieving angles.
 - f. Joints labeled "expansion joint".
- B. Installation Tolerances:
 - 1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
 - 2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
 - 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
 - 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.4 REPAIR

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.

1. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.
2. Repair methods and results subject to Architect 's approval.

3.5 CLEANING

- A. Keep cast stone components clean as work progresses.

3.6 PROTECTION

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

SECTION 04 73 00
MANUFACTURED STONE MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Adhered manufactured stone masonry veneer (AMSMV).
- B. Installation materials.
- C. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood stud backup for AMSMV; plywood and OSB sheathing.
- B. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- D. Section 07 92 00 - Joint Sealant: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

- A. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
- B. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.
- C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- D. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering; 2006 (Reapproved 2019).
- E. ASTM C1670/C1670M - Standard Specification for Adhered Manufactured Stone Masonry Veneer Units; 2017.
- F. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2016.
- G. ASTM C1780 - Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer; 2018a.
- H. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
- I. ASTM E2556/E2556M - Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment; 2010 (Reapproved 2016).
- J. ICC-ES AC51 - Acceptance Criteria for Precast Stone Veneer; 2016.
- K. NCMA (AMSV) - Installation Guide and Detailing Options for Compliance with ASTM C1780 for Adhered Manufactured Stone Veneer; Current Edition, Including All Revisions.
- L. NCMA TEK 20-01 - Key Installation Checkpoints for Manufactured Stone Veneer; 2014.
- M. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for AMSMV units, lightweight synthetic stone veneer, mortar, lath, rainscreen drainage material, and water-resistive barrier, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Color charts.
 - 4. Installation methods.
- C. Shop Drawings: Submit detail drawings depicting proper installation and flashing techniques. Coordinate locations with those found on drawings.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 12 inches square, representing actual product, color, patterns and texture.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified, with at least five years of documented experience.

1.7 MOCK-UPS

- A. Construct mock-up panel 8 feet long by 6 feet high; include AMSMV, lightweight synthetic stone veneer, mortar, accessories, substrate, and representative wall openings.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Prevent mechanical damage and contamination by other materials.
- C. Protect products from precipitation combined with freezing temperatures. Do not install products with visible frozen moisture.
- D. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.

1.9 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Provide 15 year manufacturer warranty for mortar and other installation materials used in exterior installations over steel or wood framing.
- D. Provide 25 year manufacturer warranty for mortar and other installation materials used in installations other than exterior installations over steel or wood framing.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Adhered Manufactured Stone Masonry Veneer (AMSMV):
 - 1. Basis of Design to match previous projects and existing building stone: New England Splitface Fieldstone Veneer, Supplier- Saracino Industries.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ADHERED MANUFACTURED STONE MASONRY VENEER (AMSMV)

- A. AMSMV: Cast masonry units using a mixture of cement, lightweight aggregates, concrete additives and color pigments to replicate appearance of natural stone and designed to be applied with a cementitious mortar to a backing surface, complying with ASTM C1670/C1670M and ICC-ES AC51.
 - 1. Style: Mosaic.
 - 2. Thickness: 3/4" to 1 1/2"
 - 3. Facing Area: .33 SF - 1.5SF
 - 4. Approx. 15 lbs/SF
- B. AMSMV Trim: Provide hearth stones, wall caps, drip ledges, keystones, quoins, and corner stones.
- C. Accessory Components: Provide electrical outlets, light stones, mantels, mantel brackets, and caps, as indicated on drawings.
- D. Color, blend - to match existing. Samples for verification required.

2.3 MORTAR APPLICATIONS

- A. At Contractor's option, mortar may be field-mixed from packaged dry materials or made from factory premixed dry materials with addition of water only.
- B. Scratch Coat Mortars: Scratch coat mortars for application directly to metal lath.
 - 1. Site-Mixed: ASTM C270, Type N or Type S, using the Proportion Method as specified in Section 04 05 11.
 - 2. Prepackaged/Preblended: ASTM C1714/C1714M, Type N or Type S.
- C. Setting Bed Mortars: Setting bed used to adhere AMSMV units to scratch coat mortar or to bondable concrete or concrete masonry.

1. Site-Mixed: ASTM C270, Type S, using the Proportion Method as specified in Section 04 05 11.
 2. Prepackaged/Preblended: ASTM C1714/C1714M, Type S.
 3. Prepackaged/Preblended Latex Modified: ANSI A118.4 or ANSI A118.15.
- D. Pointing Mortars: Pointing or grouting mortars used to fill the joints between individual AMSMV units once the setting bed mortar has sufficiently cured.
1. Site-Mixed: ASTM C270, Type N or Type S, using the Proportion Method as specified in Section 04 05 11.
 2. Prepackaged/Preblended: ASTM C1714/C1714M, Type N or Type S.
 3. Prepackaged/Preblended Latex Modified: ANSI A118.4 or ANSI A118.15.

2.4 MORTAR MIXES

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Type: Type S.
- B. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
1. Applications: Use this type of bond coat where indicated.
 2. Manufacturers:
 - a. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 - b. Custom Building Products: www.custombuildingproducts.com/#sle.
 - c. LATICRETE International, Inc: www.laticrete.com/#sle.
- C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.5 ACCESSORIES

- A. Water-Resistive Barrier: ASTM D226/D226M or ASTM E2556/E2556M.
- B. Lightweight Synthetic Stone Veneer Adhesive: Single-component medium-modulus elastomeric adhesive acceptable to manufacturer for interior installations.
- C. Bonding Compound: Provide type recommended for bonding scratch coat to solid surfaces, complying with ASTM C932.
- D. Cleaning Solution: Non-acidic, not harmful to AMSMV work or adjacent materials, approved by AMSMV manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that backup wall system construction complies with AMSMV manufacturer's instructions, NCMA (AMSV), NCMA TEK 20-01, ASTM C1780 and ICC-ES AC51.
- B. Verify that substrates to receive mortar scratch coat or setting bed comply with AMSMV manufacturer's instructions, NCMA (AMSV), NCMA TEK 20-01, ASTM C1780 and ICC-ES AC51:
1. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.
- C. Verify that related items provided under other sections are properly sized and located.
- D. Verify that built-in items are in proper location, and ready for installation of AMSMV.

3.2 PREPARATION

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- C. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.
- D. Apply dash bond coat to solid bases and moist cure for at least 24 hours before applying setting bed.

3.3 INSTALLATION - WATER-RESISTIVE BARRIER

- A. Where required by AMSMV manufacturer's instructions, NCMA (AMSV), NCMA TEK 20-01, ASTM C1780 or ICC-ES AC51, install 2 layers of water-resistive barrier in accordance with water-resistive barrier manufacturer's instructions. Integrate water-resistive barrier with all flashing accessories, adjacent water-resistive barriers, doors, windows, penetrations, and cladding transitions.
- B. Apply water-resistive barrier horizontally with upper layer lapped over lower layer minimum 2 inches.
- C. Lap water-resistive barrier minimum 6 inches at vertical joints.
- D. Lap water-resistive barrier minimum 16 inches past the corner in both directions at inside and outside corners.
- E. In two layer applications, start with two horizontal layers at bottom of exterior wall or structure.

3.4 INSTALLATION - AMSMV

- A. Install AMSMV with a cementitious mortar setting bed to a scratch coat backing surface, in accordance with AMSMV manufacturer's instructions, NCMA (AMSV), NCMA TEK 20-01, ASTM C1780 and ICC-ES AC51.
- B. Mortar Joints: Concave.
 - 1. Style: Tight fit joints.
- C. Windows, Doors and Wall Openings: Butt AMSMV units to wall opening.
- D. Sills: Install sills where located on drawings.
- E. Caps: Install capstones where located on drawings.
- F. Seal all joints at wall openings and penetrations with sealant approved for use with AMSMV.

3.5 CONTROL AND EXPANSION JOINTS

- A. Form joints as detailed on drawings.

3.6 TOLERANCES

- A. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.

3.7 CUTTING AND FITTING

- A. Cut and fit for pipes and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

3.8 CLEANING

- A. Clean AMSMV in accordance with manufacturer's installation instructions.
- B. Clean soiled surfaces with cleaning solution.

3.9 PROTECTION

- A. Protect finished work from rain during and for 48 hours following installation.
- B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members, support members.
- B. Base plates, anchors.
- C. Grouting under base plates.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Coordination and Project Conditions
- B. Section 05 21 00 - Steel Joist Framing.
- C. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.
- D. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.
- G. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2018.
- H. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.
- I. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- J. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.
- K. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2018.
- L. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.
- M. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2018a.
- N. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.

- O. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.
- P. 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; 2018.
- Q. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- R. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- T. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- U. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- V. SSPC-SP 3 - Power Tool Cleaning; 2018.
- W. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- X. SSPC-SP 10 - Near-White Blast Cleaning; 2007.
- Y. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections.
 - 3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- F. Designer's Qualification Statement.
- G. Fabricator's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Maintain one copy of each document on site.
- C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience with current AISC Quality Management Systems (QMS) Certification, Certified Building Fabricator, BU.
 - 1. Non AISC certified companies are acceptable with the following requirements:
 - a. A special inspector hired by the owner will be required to observe all fabrication of the structural steel for this project.

- b. The cost for the special inspection fees incurred during fabrication shall be reimbursed to the owner by the contractor.
- D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.
- E. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- F. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of New York.
- G. Shop Painter: Company specializing in performing Work of this section with minimum 3 years documented experience with the following current AISC Certification:
 - 1. Sophisticated Paint Endorsement - Enclosed (P1)
 - 2. Sophisticated Paint Endorsement - Covered (P2)
 - 3. Sophisticated Paint Endorsement - Outside (P3)
- H. Welders and Welding Procedures: AWS D1.1 Structural Welding Code - Steel, qualified within previous 12 months.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Rolled Steel Structural Shapes: ASTM A992/A992M.
- D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.
- E. Steel Plate: ASTM A514/A514M.
- F. Pipe: ASTM A53/A53M, Grade B, Finish black.
- G. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.
- H. Headed Anchor Rods: ASTM F1554, Grade 36, plain.
- I. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.
- J. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- K. Sliding Bearing Plates: Teflon coated.
- L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
- M. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- N. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
 - 1. Color: Gray
- C. Galvanize structural steel members to comply with ASTM A 123/A 123M. Provide minimum 1.7 oz/sq ft galvanized coating. Galvanize after fabrication.
- D. All exterior exposed steel to be galvanized.
- E. Galvanizing for Fasteners, connectors and Anchors
 - 1. Hot-dipped Galvanizing: ASTM A153/A153M
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.4 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Shop test bolted and welded connections as specified for field quality control tests.
- C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.
 - 1. Verify bearing surfaces are at correct elevation.
 - 2. Verify anchor rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components indicated on shop drawings.

- D. Field connect members with threaded fasteners; torque to required resistance. Tighten to snug tight for bearing type connections.
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.3 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing. 01 41 00 - Special Inspections.
- B. Bolted Connections: Inspect in accordance with AISC specifications.
 - 1. Visually inspect all bolted connections.
 - 2. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.
- C. Welded Connections: Inspect welds in accordance with AWS D1.1.
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Visually inspect all welds.
 - 3. Radiographic testing performed in accordance with ASTM E 94. Performed when directed by Architect/Engineer.
 - 4. Ultrasonic testing performed in accordance with ASTM E 164. Perform on all full penetration welds.
 - 5. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
 - 6. Magnetic particle inspection performed in accordance with ASTM E 709. Performed when directed by Architect/Engineer.
- D. Correct defective bolted connections and welds.

END OF SECTION

SECTION 05 21 00
STEEL JOIST FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.
- B. Supplementary framing for floor openings greater than 18 inches.

1.2 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel Framing: Superstructure framing.
- B. Section 05 31 00 - Steel Decking: Support framing for openings less than 18 inches in decking.
- C. Section 05 50 00 - Metal Fabrications: Non-framing steel fabrications attached to joists.
- D. Section 03 30 00: Placement of anchors for casting into concrete.
- E. Section 04 20 00: Placement of anchors for embedding into masonry.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- H. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- I. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Provide shop drawings consisting of a framing plan and details developed by the steel joist manufacturer indicating standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.
 - 1. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Design calculations for each special joist designation (indicated as "SP" on the drawings) shall be submitted with shop drawings.

- a. The special joists shop drawings and design calculations shall be designed and detailed by a professional engineer licensed to practice in the State of New York. Submittals shall bear their seal and signature.
 - b. Standard SJI designations shall be designed to the SJI specified design loads and need not be submitted.
- C. Joist Manufacturer's SJI Accreditation Certificate.

1.5 QUALITY ASSURANCE

- A. Design Responsibility: The design of the steel joist and associated connections shall be in accordance with applicable codes, regulations, and performance requirements herein provided, and shall be the sole responsibility of the steel joist manufacturer.
- B. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State of New York.
 - 1. Comply with applicable codes for submission of design calculations, shop drawings, and erection drawings as required for acquiring permits.
 - 2. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.
- C. The Joist Manufacturer shall be certified by the Steel Joist Institute to engage in the design, manufacturing and distribution of steel joists and accessories.
 - 1. Joists manufactured by a non-certified shop may be provided. During production these joists require special inspections. The special inspections shall be provided at the cost of the contractor.
- D. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 5 (five) years documented experience.
- E. Erector Qualifications: Company specializing in performing the work of this section with minimum 5 (five) years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Joists:
 - 1. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
 - 2. New Columbia Joist Co.

2.2 MATERIALS

- A. Open Web Joists: SJI Type K Joists:
 - 1. Provide bottom and top chord extensions as indicated.
 - 2. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
 - 3. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
 - 4. Finish: Shop primed.

- B. Anchor Bolts, Nuts and Washers: ASTM A307, hot-dip galvanized per ASTM A153/A153M, Class C.
 - 1. Anchor Rods: ASTM F1554; Grade 36, weldable, straight
 - 2. Nuts: ASTM A563 heavy hex type, unfinished
 - 3. Washers: ASTM F436; Type 1, circular, unfinished
- C. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1, Red Oxide.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION

- A. Furnish bottom and top chord extensions as indicated on drawings.
- B. Fabricate to achieve end bearing requirements.
- C. If joist splice is required:
 - 1. Provide field welded splice connection at exposed conditions.
 - 2. Provide bolted splice connection where ceilings are to be installed.

2.4 FINISH

- A. Shop prime joists and supplementary framing members.
 - 1. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.
 - 2. Galvanize steel ledge angles, galvanize after fabrication.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.
- C. Galvanizing: Provide minimum 2.0 oz/sq ft galvanized coating to ASTM A123/A123M requirements.
- D. Galvanizing for Fasteners, Connectors and Anchors:
 - 1. Hot-Dipped Galvanizing: ASTM A153/A153M
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum

2.5 SOURCE QUALITY CONTROL

- A. Provide shop testing and analysis of steel components.
- B. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions
- B. Verify existing conditions prior to beginning work.

3.2 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- D. Position and field weld joist chord extensions and wall attachments as detailed.
- E. Install supplementary framing for floor and roof openings greater than 18 inches.
- F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- G. Do not field cut or alter structural members without approval of Architect/Engineer and joist manufacturer.
- H. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed, except surfaces specified not to be primed or in contact with concrete.

3.3 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances
- B. Maximum Variation From Plumb: 1/4 inch.
- C. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting and balancing
- B. Field inspect members, connections, welds and tightening of high strength bolts in slip-critical connections.

END OF SECTION

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof deck.
- B. Composite floor deck.
- C. Supplementary framing for openings up to and including 18 inches.
- D. Bearing plates and angles.
- E. Acoustical insulation in roof deck flutes.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck; placement of anchors for bearing plates in precast concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- C. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- D. Section 05 21 00 - Steel Joist Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- E. Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.3 REFERENCE STANDARDS

- A. ASCE 3 - Standard Practice for the Construction and Inspection of Composite Slabs.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- F. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process; 2019.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- I. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- C. Certificates: Certify that products furnished meet or exceed specified requirements.
- D. Submit manufacturer's installation instructions.

1.5 PERFORMANCE REQUIREMENTS

- A. Design metal deck in accordance with SDI 29 Design Manual.
- B. Perform Work in accordance with ASCE 3 for composite decks.

1.6 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of New York.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Cut plastic wrap to encourage ventilation.
- C. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Deck Manufacturers:
 - 1. United Steel Deck: www.unitedsteel.com
 - 2. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
 - 3. Epic Metals Corporation: www.epicmetals.com
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 STEEL DECK

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 - 1. Calculate to structural working stress design and structural properties specified.
 - 2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
 - 3. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
- B. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating conforming to ASTM A924/A924M.
 - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 - 3. Structural Properties:
 - a. Section Modulus: As indicated on drawings.

- b. Span Design: Multiple.
 4. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch unless noted otherwise on drawings.
 5. Nominal Height: 1-1/2 inch.
 6. Profile: Fluted; SDI WR.
 7. Formed Sheet Width: 36 inch.
 8. Side Joints: Lapped.
 9. Flute Sides: plain vertical face
- C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating conforming to ASTM A924/A924M.
 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 3. Structural Properties:
 - a. Section modulus: As indicated on drawings.
 4. Span Design: Multiple.
 5. Minimum Base Metal Thickness: 22 gage, 0.0299 inch unless noted otherwise on drawings.
 6. Nominal Height: As indicated on drawings.
 7. Formed Sheet Width: 36 inch.
 8. Side Joints: Lapped.
 9. Flute Sides: diagonally ribbed for improved concrete bond

2.3 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.
- B. Welding Materials: AWS D1.1/D1.1M.
- C. Fasteners: Galvanized hardened steel, self tapping.
- D. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- F. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.
- G. Acoustical Insulation: Glass fiber type, minimum 3 lb/cu ft density; profiled to suit deck. Spacers to support the acoustical insulation above the bottom flat area of the deck to facilitate field painting.
- H. Sheet Steel: ASTM A653, Grade 33 Structural Quality; with G90 galvanized coating conforming to ASTM A924

2.4 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage thick sheet steel; of profile and size as indicated on drawings; finished same as deck.
- B. Cant Strips: Formed sheet steel, 20 gage, .0359 inch minimum thickness, 45 degree slope, 3-1/2 inch nominal width and height, flange for attachment.
- C. Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- D. Floor Drain Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch bearing.
- C. On steel supports provide minimum 1-1/2 inch bearing.
- D. Fasten deck to steel support members at ends and intermediate supports as indicated on drawings.
- E. Mechanically fasten or weld male/female side laps as indicated on drawings.
- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- H. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- I. At floor edges, install wet concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- J. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- K. Close openings above walls and partitions perpendicular to deck flutes with double row of foam cell closures.
- L. Seal deck joints, laps, ends and penetrations with sealant to achieve permanent air seal consistent with air barrier system specified in Section 07 25 00.
- M. Place metal cant strips in position and fusion weld.
- N. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- O. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- P. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.3 FIELD QUALITY CONTROL

- A. Welding: Inspect welds in accordance with AWS D1.1

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formed steel stud exterior wall and interior wall framing.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00: Unit Masonry.
- B. Section 07 21 00 - Thermal Insulation: Insulation within framing members.
- C. Section 09 21 16 - Gypsum Board Assemblies: Cold-formed steel nonstructural framing.
- D. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
- E. Section 09 24 00 - Cement Plastering.

1.3 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.
- 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 A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- G. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to metal framing systems, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on cold-formed steel structural members; include material descriptions and base steel thickness.
- C. Product Data: Provide manufacturer's data on factory-made connectors and mechanical fasteners, showing compliance with requirements.

- D. Product Data: For lateral-force resisting systems, provide product data sheets on hold-down, showing compliance with requirements.
- E. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
- F. Manufacturer's Installation Instructions: For lateral-force resisting systems, indicate welding procedure specifications and mechanical fastener installation procedures.
- G. Installation Drawings: Indicate dimensioned locations of cold-formed steel structural framing.
- H. Mill Certifications: Submit mill certifications for steel delivered to site. Certify steel bare metal thickness in 0.001 inch, yield strength, tensile strength, total elongation in 2 inch or 8 inch gage length, chemical analysis and galvanized coating thickness.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a professional structural engineer experienced in designing this work and licensed in the State of New York.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Structural Framing:
 - 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 2. MarinoWARE: www.marinoware.com/#sle.
 - 3. The Steel Network, Inc: www.SteelNetwork.com/#sle.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Connectors:
 - 1. Same manufacturer as metal framing.
 - 2. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 3. MarinoWARE: www.marinoware.com/#sle.
 - 4. Simpson Strong Tie: www.strongtie.com/#sle.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC), ASCE 7, AISI S100, and AISI S240.

2.3 MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

2.4 STRUCTURAL FRAMING COMPONENTS

- A. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.
 - 1. Gage: Determined from load requirements, 18 gage/.043 inch minimum.
 - 2. Depth: As indicated on drawings
 - 3. Stud Spacing: 16" o.c. maximum
 - 4. Provide components fabricated from ASTM A1011/A1011M, Designation SS (structural steel).
- B. Jamb Studs: AISI S240; manufactured, engineered, c-shaped with wide flanges, designed to replace conventional double-stud framing at openings.
- C. Headers: AISI S240; manufactured, engineered one-member or two-member assemblies, with wide flanges, designed to replace conventional box or nested header framing at openings.
 - 1. Jamb Mounting Clips: Manufacturer's standard.

2.5 MISCELLANEOUS CONNECTIONS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot-dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.
- C. Welding: Comply with AWS D1.1/D1.1M.

2.6 SHEATHING

- A. Gypsum Board Wall Sheathing: See Section 09 21 16.
- B. Board Insulation Wall Sheathing: See Section 07 21 00.

2.7 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
- C. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements; Coordination and project conditions.
- B. Verify that substrate surfaces and building framing components are ready to receive work.
- C. Verify rough-in utilities are in proper location.

3.2 INSTALLATION - GENERAL

- A. Install structural members and connections in compliance with AISI S240.

3.3 INSTALLATION OF STUDS

- A. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- B. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- C. Install load-bearing studs; brace, and reinforce to develop full strength and achieve design requirements.
- D. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- E. Install intermediate studs above and below openings to align with wall stud spacing.
- F. Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.
- G. Attach cross studs or furring channels to studs for attachment of fixtures anchored to walls.
- H. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- I. Touch-up field welds and damaged corrosion protected surfaces with primer.

3.4 INSTALLATION OF WALL SHEATHING

- A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
 - 1. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.6 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated steel and metal items, including:
 - 1. Bollards
 - 2. Ledge and shelf angles
 - 3. Lintels
 - 4. Structural supports for miscellaneous attachments

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 09 91 13 - Exterior Painting: Paint finish.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- G. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- I. NOMMA Guideline 1 - Joint Finishes
- J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- L. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.5 QUALITY ASSURANCE

- A. Design components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of New York.
- B. Finish joints in accordance with NOMMA Guideline 1.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Steel Plates: ASTM A 36/A 36M.
- D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A 653, Grade 33 Structural quality with galvanized coating.
- F. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- G. Bolts, Nuts, and Washers:
 - 1. Bolts: ASTM F3125; Type 1
 - 2. Nuts: ASTM A 563 heavy hex type
 - 3. Washers: ASTM F 436; Type 1
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1, complying with VOC limitations of authorities having jurisdiction.
 - 1. Color: Gray
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 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. Continuously seal joined members by continuous welds.
- D. 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.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized and prime paint finish.
 - 1. Concrete fill: 3,000 psi as specified in Section 03 30 00.
 - 2. Anchors: Concealed type as indicated on drawings.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking, joists, and masonry; galvanized where indicated, prime paint finish.
- C. Lintels: Steel sections, size and configuration as detailed on drawings, length to allow 8 inches minimum bearing on both sides of opening.
 - 1. Galvanized and Prime paint, one coat
- D. Other Structural Supports: Steel sections, shape and size as indicated on drawings required to support applied loads with maximum deflection of 1/240 of the span; prime paint, one coat.
- E. Anchor bolts: ASTM F 1554; Grade 36, weldable, straight shape, Furnish with nut and washer; unfinished.

2.4 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items as specified in drawings.
 - 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.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements; minimum 2.0 oz/sq ft coating thickness.
- G. Galvanizing for Fasteners, Connectors and Anchors: Hot-Dipped Galvanizing to ASTM A 153/A 153M.

2.5 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.

- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 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 or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

- A. Welding: Inspect welds in accordance with AWS D1.1.

END OF SECTION

SECTION 05 75 00
DECORATIVE FORMED METAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior fabrications made of formed metal sheet, secondary supports, and anchors to structure, including:
 - 1. Factory fabricated column covers.

1.2 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications: Non-decorative metal fabrications.
- B. Section 09 91 23 - Interior Painting.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- E. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use; 2014.
- F. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2019a.
- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- J. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- K. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- L. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements; 2018.
- M. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2017.
- N. ASTM F594 - Standard Specification for Stainless Steel Nuts; 2009 (Reapproved 2015).

- O. ASTM F1941/F1941M - Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric; 2016.
- P. NAAMM AMP 500-06 - Metal Finishes Manual; 2006.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data - Sheet Metal Material: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 - 1. Differentiate between shop and field fabrication.
 - 2. Indicate substrates and adjacent work with which the fabrications must be coordinated.
 - 3. Include large-scale details of anchorages and connecting elements.
 - 4. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1/2 inches per 12 inches.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 12 inches square, representing actual product in color and texture.
- F. Installer's Qualification Statement.
- G. Maintenance Data: Care of finishes and warranty requirements.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating products specified in this section.
 - 1. With not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
 - 1. With minimum 3 years of documented experience.
- C. Mock-Up: Provide a mock-up for evaluation of fabrication workmanship.
 - 1. Locate where directed.
 - 2. Provide products finished as specified.
 - 3. Mock-up may remain as part of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 1. Protect finishes by applying heavy duty removable plastic film during production.
 - 2. Package for protection against transportation damage.
 - 3. Provide markings to identify components consistently with drawings.

4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
1. Store in well-ventilated space out of direct sunlight.
 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
 3. Store at a slope to ensure positive drainage of accumulated water.
 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F.
 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Factory Fabricated Column Covers:
1. Moz; <https://mozdesigns.com/>. (Basis of Design)
 2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FACTORY FABRICATED COLUMN COVERS

- A. Factory Fabricated Column Covers: Factory fabricated, engraved, and factory finished, sheet metal column covers, mechanically fastened to structural support.
1. Material: Aluminum: Type 5052 alloy complying with ASTM B209.
 2. Sheet Thickness: 0.090 inch, minimum.
 3. Column Section Length: 12 feet, maximum, between horizontal joints.
 4. Vertical Joint Type: Vertical Butt.
 5. Base: Provide 6" Recessed Base, brushed stainless steel.
 6. Horizontal Reveals: Manufacturer's standard Horizontal Open Reveal; at locations indicated on drawings.
 7. Fasteners: Self-drilling; ASTM A449 heat treated steel, with manufacturer's standard corrosion resistant coating.
 8. Aluminum Finish: Manufacturer's standard powder coating.
 9. Color: Refer to Drawings.
 10. Shape: Round and Square. Refer to Drawings.
 11. Overall Height: Refer to Drawings.
 12. Manufacturers, Basis of Design:
 - a. Moz; <https://mozdesigns.com/>.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 MATERIALS

- A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections exposed to view on finished units.
- B. Aluminum Sheet: ASTM B209/B209M, 5005-H32 minimum; alloy and temper recommended by aluminum producer and finisher for use and finish indicated.
- C. Anchors, Clips and Accessories: Use one of the following:

1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
 2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
 3. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A123/A123M Coating Grade 35.
 4. Interior Locations: Carbon steel; zinc coated in accordance with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5.
 5. Exterior Locations or in Contact with Stainless Steel:
 - a. Bolts: Stainless steel; ASTM F593, Group 1 (A1).
 - b. Nuts: Stainless steel; ASTM F594.
 6. Structural Anchors: Provide anchors where work is indicated to comply with design loads.
 - a. Type: Provide chemical or torque-controlled expansion anchors.
 - b. Capacity: When tested according to ASTM E488/E488M; four times the load imposed when installed in concrete.
 7. Nonstructural Anchors: Provide powder-actuated fasteners where work is not indicated to comply with design loads. Provide size and number required for load, installation, and as recommended by manufacturer, unless indicated otherwise.
 8. Provide stud framing and supports per manufacturers requirements to install and mount column covers per specifications.
- D. Fasteners, General: Same basic metal and alloy as formed metal sheet unless indicated otherwise. Do not use metals incompatible with the materials joined.

2.4 FINISHES

- A. Finishes, General: Comply with NAAMM AMP 500-06.
1. Complete mechanical finishes before fabrication. After fabrication, finish joints, bends, abrasions and surface blemishes to match sheet.
 2. Protect mechanical finishes on exposed surfaces from damage.
 3. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
 4. Appearance: Limit variations in appearance of adjacent pieces to one-half of range represented in approved samples. Noticeable variations in same piece are not acceptable. Install components within range of approved samples to minimize contrast.
- B. Aluminum Finishes:
1. Color: As indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and interfaces with other work.
- B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.
- B. Provide studs, blocking, backing and support framing to allow installation per manufacturer's requirements.

3.3 INSTALLATION - SHEET METAL AND PLATE FABRICATIONS

- A. Locate and place decorative formed sheet metal items level and plumb; align with adjacent construction. Cut, drill and fit as required to install.
- B. Do not cut or abrade sheet metal finishes that cannot be completely restored in the field. Return such items to manufacturer or fabricator for required alterations and refinishing or provide new items.
- C. Use concealed anchorages where possible. Provide washers where needed on bolts or screws to protect metal surfaces and make weathertight connection.
- D. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers indicated.
- E. Install gaskets, joint fillers, insulation, sealants, and flashings as work progresses.
 - 1. Make exterior decorative formed sheet metal items weatherproof.
 - 2. Make interior decorative formed metal items soundproof or lightproof as required.
- F. Corrosion Protection: Apply permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with incompatible substrate materials. Prevent corrosion damage to material and finish.

3.4 CLEANING

- A. Restore finishes damaged during installation and construction period. Return items that cannot be refinished in the field to manufacturer or fabricator. Refinish entire unit or provide new units.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Protect installed products from damage during construction.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheathing.
- B. Preservative treated wood materials.
- C. Fire retardant treated wood materials.
- D. Concealed wood blocking, nailers, and supports.

1.2 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. 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.
 - 3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - 4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.2 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.

2.3 EXPOSED DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings.
- B. Surfacing: S4S.
- C. Moisture Content: S-dry or MC19.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Stainless steel for high humidity and preservative-treated wood locations, hot dipped galvanized per ASTM A153/A153M elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
 - 3. Fasteners for roof replacements must be included in the Singly-Ply Roofing membrane manufacturer's warranty to meet uplift pressures determined in accordance with the Applicable Code using a basic wind speed of 120 MPH.

2.5 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. Products:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. 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. Do not use treated wood in direct contact with the ground.
 - 3. 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. Treat rough carpentry items as indicated .
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

- C. Preservative Treatment: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.
 - 1. Products:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.2 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.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items.
- B. Wood casings and moldings.
- C. Hardware and attachment accessories.
- D. Exterior PVC Composite Fascia and Trim, and Soffits (including Tounge & Groove)

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 09 91 13 - Exterior Painting: Painting of finish carpentry items.

1.3 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- B. ANSI A208.1 - American National Standard for Particleboard; 2016.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).
- E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).
- F. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- G. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.
- H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on fire retardant treatment materials and application instructions.
 - 2. Provide instructions for attachment hardware and finish hardware.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- D. Samples: Submit two samples of trim 12 inch long.

- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- F. Manufacturer's Instructions: Provide manufacturer's installation instructions for factory-fabricated units.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.6 MOCK-UPS

- A. Locate where directed.
- B. Mock-up may remain as part of the work.

PART 2 PRODUCTS

2.1 FINISH CARPENTRY ITEMS

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.
- C. Exterior Woodwork Items:
 - 1. Trim, Soffits and Fascias: Prepare for paint finish.
 - 2. Enclosing Soffit Spaces: As detailed.

2.2 LUMBER MATERIALS

- A. Hardwood Lumber: Solid Maple species, Plain/Flat sliced sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

2.3 SHEET MATERIALS

- A. Hardwood Plywood: Face species as indicated, plain sawn, book matched, medium density fiberboard core; HPVA HP-1, Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.
- B. Particleboard: ANSI A208.1; Composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.
- C. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth one side (S1S).

2.4 FASTENINGS

- A. Fasteners: Of size and type to suit application; no finish in concealed locations and Hot dipped galvanized steel for high humidity finish in exposed locations.
- B. Concealed Joint Fasteners: Threaded steel.

2.5 EXTERIOR PVC TRIM & SOFFIT

- A. PVC Soffit; Tongue & Groove, Blind Nail Plank, Extruded.
 - 1. 1/2" thickness
 - 2. 6" width, 5" exposed
 - 3.
 - 4. Manufacturers: Same as Trim below.
- B. Cellular PVC Trim and Moldings: Extruded, expanded PVC; UV-resistant, heat-stabilized, and rigid material; for exterior use only. Provide PVC trim to match existing at all new fascias, soffits, and associated details. Provide PVC trim to patch to match existing as needed.
 - 1. Density: 31 pounds per cubic foot, minimum.
 - 2. Flame Spread: ASTM E84, 75, maximum.
 - 3. Sizes/Dimensions- as indicated on drawings.
 - 4. Manufacturers:
 - a. AZEK Building Products, Inc; PVC Trim: www.azek.com/#sle.
 - b. Royal Corinthian; RoyalPVC: www.royalcorinthian.com/#sle.
 - c. Versatex Building Products, LLC; Canvas Series: www.versatex.com/#sle.
 - d. Wolf Home Products; Wolf Trim: www.wolfhomeproducts.com/#sle.
- C. Primer: Alkyd primer sealer.

2.6 SITE FINISHING MATERIALS

- A. Stain, Shellac, Varnish, and Finishing Materials: Comply with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.7 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- C. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- D. Shop prepare and identify components for book match grain matching during site erection.
- E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- F. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

2.8 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
- D. Back prime finish carpentry items to be field finished, prior to installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Install factory-fabricated units in accordance with manufacturer's printed installation instructions.
- C. Set and secure materials and components in place, plumb and level.
- D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- E. Install components with nails, screws and bolts as indicated . Where not indicated provide fastener type to suit application and with least visibility.
- F. Install prefinished paneling with full bed contact adhesive applied to substrate.

END OF SECTION

SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware.
- B. Preparation for installing utilities.
- C. Custom designed millwork and other items as detailed on drawings.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 09 65 00 - Resilient Flooring: Vinyl Base.
- C. Section 12 36 00 - Countertops.
- D. Division 22 - Plumbing utilities and fixtures.
- E. Division 26 and 27 - Power, signal and data wiring.

1.3 REFERENCE STANDARDS

- A. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ANSI A208.1 - American National Standard for Particleboard; 2016.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).
- E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).
- F. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.
- G. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; 1996a (Validated 2013).
- H. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.
- I. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.
- K. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.
 - 1. Mock-up to be presented to Architect for approval during or just prior to this meeting.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum ten years of documented experience.
 - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
 - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

1.7 MOCK-UPS

- A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. See Section 01 40 00 - Quality Requirements for additional requirements.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect units from moisture damage.

1.9 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.
- B. Do not install cabinets until all mortar, moisture and dust producing work is completed.
- C. Provide portable fans and ventilate rooms receiving new casework for minimum of one week after installation of new cabinets. Continue operation of fans and ventilation of rooms until owner determines that all fumes related to cabinets have been dissipated.
- D. Verify field measurements prior to fabrication.

1.10 REGULATORY REQUIREMENTS

- A. Cabinets and cabinet finish system are to meet Class "C" rating or better for flame spread (200 or less) and shall have a smoke developed rating of less than 450.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Campbell Rhea Division Mohon International, Inc; Heritage Maple Series.
- B. CiF Lab Solutions: www.cifsolutions.com.
- C. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Single Source Responsibility: Provide this work from single fabricator.

2.2 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Species of Veneer: Maple.
- C. Cut or Slicing of Veneer: Plain / Flat Sliced.
- D. Matching of Individual Leaves to Each Other: Book matching.
- E. Matching Across the Panel Face: Pair matching.
- F. Matching of Panels to Each Other: Sequence matched uniform size sets.
- G. Cabinet Frame: Solid hardwood lumber with pinned mortise and tenon joints.
- H. Stiles and Rails: Solid Maple lumber.
- I. Wood Drawer Fronts: 3/4" thick solid Maple core with Maple veneer; Interior rabbeted edges with 3/8" exterior radiused edge.
- J. Drawer Boxes: Solid hardwood lumber (1/2" thick) with dovetailed joints.
- K. Drawer Bottoms: 1/4" hardwood plywood.
- L. Cabinet Back: 1/4" hardwood plywood.
- M. Cabinet Sides: 3/4" 7-ply hardwood plywood with Maple veneer on all exposed surfaces.
 - 1. Tall cabinets with 3/4" sides shall be constructed with a fixed center shelf rigidly attached to either side of the cabinet to prevent bowing of the sides.
- N. Cabinet Tops: 1" hardwood plywood for all cabinet tops.
- O. Cabinet Bottoms: 1" hardwood plywood for all wall cabinets.
- P. Shelves: 1" hardwood plywood, full depth, for all shelves, interior or exposed.
 - 1. Maple plywood where exposed.
 - 2. Exposed plywood edge is to be covered with a factory applied one-piece 3/8" thick solid Maple nosing.
- Q. Wood Doors:
 - 1. Maple veneer over 3/4 inch x 1 1/8 inch wide solid Maple frame. Maple veneer to be on front and back of door. Interior rabbeted edges with 3/8" exterior radiused edge.
 - 2. Tall cabinets to be 1 inch thick lipped reveal overlay style.
 - a. Core Construction: particleboard.
- R. Exposed Edges: All exposed plywood edges are to be covered with a factory applied one-piece 3/8" thick solid Maple nosing.

- S. Cabinet Baseboard: 3/4" hardwood plywood.
- T. Finished Baseboard: 4" vinyl base. See finish schedule for color.
- U. Wood Trim: Solid Maple lumber. Size as indicated on drawings.

2.3 PANEL MATERIALS

- A. Veneer Faced Plywood Finish: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core of veneer (wood plies); type of glue recommended for specific application; thickness as required; face veneer as follows:
 - 1. Exposed Surfaces: Grade AA, Maple, plain sliced, book-matched.
 - 2. Semi-Exposed Surfaces: Grade A, Maple, rotary cut, random-matched.
 - 3. Concealed Surfaces: Grade B, Maple, rotary cut, random-matched.
- B. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with moisture resistant adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.
- C. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.4 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. 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.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface. Provide 2" diameter grommet and cover at each computer work station and printer stations. Exact location to be verified in the field.

2.5 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Bumper Pads: All moving items, including but not limited to, doors and drawers shall be provided with manufacturer's standard bumper pads to ensure quiet closure.
- C. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for clip supports and coordinated shelf rests, for nominal 1-1/4" inch spacing adjustments.
 - 1. Shelf clip supports shall be dual peg, plastic, with minimum length of 2-1/4".
 - a. Clips shall have integral hold down tabs to secure 3/4 and 1 inch shelves.
 - b. Capacity: 300 pounds per clip.
- D. Drawer and Door Pulls: Die cast aluminum pull, Brushed aluminum finish, 4" centers.
- E. Cabinet Locks: Keyed cylinder, master keyed, steel with satin finish.
 - 1. All locks within each room keyed the same. Each room keyed differently.
 - 2. Provide four (4) keys per room.
 - 3. Equip each lock with removable core, similar to CompX National locks.
 - 4. Provide locks at all doors and drawers, unless noted otherwise in Contract Drawings.
- F. Cabinet Catches and Latches:

1. Type: Push latch.
- G. Drawer Slides:
 1. Type: Full extension.
 2. Static Load Capacity: Heavy Duty grade; 200 lb, minimum.
 3. Mounting: Side mounted.
 4. Action to be progressive movement on precision ball bearings.
 5. Stops: Integral type.
 6. Manufacturers:
 - a. Fulterer USA; FR 5210: www.fultererusa.com.
- H. Hinges: Butt, five knuckle disappearing type, 2-3/4 inch and .090 inch thick with hospital tips, steel with polished finish.
- I. Sliding Door Track Assemblies: Upper and lower track of galvanized steel construction, ball bearing carriers fitted within tracks, multiple pendant suspension attachments for door .
- J. Hooks: Double hooks, back mounted. Brushed Chrome finish.

2.6 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with 3/8" thick solid Maple nosing. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

2.7 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- D. Seal surfaces in contact with cementitious materials.
- E. Topcoats are to be baked on.
- F. Finish work in accordance with AWI/AWMA/WI (AWS) or AWMA/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 1. Transparent: 2 Colors required as indicated on plans
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Stain: As selected by Architect. 2 stain colors to match 2 separate areas within the building.
 - c. Sheen: Flat.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- G. Provide and install all trim and filler panels required to fill in all gaps between casework, lockers and adjacent wall or ceiling surfaces or to provide closure of mechanical items. Provide a complete seamless installation. (Filler panels must also be installed in gaps on top of casework).
 - 1. Trim and filler panels to match material and finish of cabinets. Filler panels shall be of equivalent length at each side of each run of casework.

3.3 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting and balancing.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.
- C. Ensure finished work is free of all markings made during fabrication.

SECTION 07 05 53
FIRE AND SMOKE ASSEMBLY IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping

1.3 REFERENCE STANDARDS

- A. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of marking, indicating font, foreground and background colors, wording, and overall dimensions.
- C. Schedule: Completely define scope of proposed marking, and indicate location of affected walls and partitions, and number of markings.
- D. Samples: Submit two samples of each type of marking proposed for use, of size similar to that required for project, illustrating font, wording, and method of application.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 FIELD CONDITIONS

- A. Do not install adhered markings when ambient temperature is lower than recommended by label or sign manufacturer.
- B. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Partition Identification Labels:
 - 1. Fire Wall Signs, Inc: www.firewallsigns.com/#sle.
 - 2. Safety Supply Warehouse, Inc: www.safetysupplywarehouse.com/#sle.
 - 3. Stencil Ease: www.stencilease.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FIRE AND SMOKE ASSEMBLY IDENTIFICATION

- A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).
- B. Adhered Fire and Smoke Assembly Identification Signs: Printed vinyl sign with factory applied adhesive backing.
- C. Applied Fire and Smoke Assembly Identification: Identification markings applied to partition with paint or permanent ink and a code compliant stencil.
- D. Location: On fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions; within concealed space where there is an accessible concealed floor, floor-ceiling, or attic space.
- E. Languages: Provide sign markings in English.
- F. Format: Whether adhered or applied, identification shall include, at a minimum:
 - 1. Lettering: Not less than three inches in height with a minimum 3/8 inch stroke, in contrasting color.
 - 2. Wording shall include, as applicable:
 - a. Wall Type, i.e FIRE BARRIER or SMOKE BARRIER, or similar.
 - b. Fire Resistance Rating, i.e. ONE HOUR, TWO HOUR, or similar.
 - c. PROTECT ALL OPENINGS.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

- A. Locate markings as required by ICC (IBC).
 - 1. No more than fifteen feet from end of each rated wall.
 - 2. No more than thirty feet interval measured horizontally along the rated wall or partition.
 - 3. Rated walls shall be identified on each side.
- B. Install adhered markings in accordance with manufacturer's instructions.
 - 1. Where adhered markings are used, a suitable Class A backer, permanently attached to the wall, may be used when wall surface would preclude adhesion.
- C. Install applied markings in accordance with manufacturer's instructions.
- D. Install neatly, with horizontal edges level.
- E. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

SECTION 07 13 00
SHEET WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Self-adhered modified bituminous sheet membrane.

1.2 RELATED REQUIREMENTS

- A. Section 07 21 00 - Thermal Insulation: Insulation used for protective cover.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal parapet, coping, and counterflashing.

1.3 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016.
- B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2018).
- C. ASTM D751 - Standard Test Methods for Coated Fabrics; 2006 (Reapproved 2011).
- D. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2018.
- E. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2019.
- F. ASTM D 3767 - Standard Practice for Rubber—Measurement of Dimensions.
- G. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 1993, with Editorial Revision (2014).
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- I. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a, with Editorial Revision (2013).
- J. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- 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 products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Construct mock-up consisting of 100 sq ft of horizontal and vertical sheet waterproofing panel; to represent finished work including internal and external corners, seam jointing, and attachment method.
- C. Locate where directed.
- D. Mock-up may remain as part of work.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Contractor to correct defective Work within period of five years after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

PART 2 PRODUCTS

2.1 SHEET WATERPROOFING APPLICATIONS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
 - 1. Location: Foundation Walls.
 - 2. Cover with protection board and drainage panel. Provide perimeter drain at footings.

2.2 SHEET WATERPROOFING MATERIALS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
 - 1. Thickness: 60 mil, 0.060 inch, minimum.
 - 2. Sheet Width: 36 inches, minimum.
 - 3. Tensile Strength:
 - a. Film: 5,000 psi, minimum, measured in accordance with ASTM D882 and at grip-separation rate of 2 inches per minute.
 - b. Membrane: 325 psi, minimum, measured in accordance with ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
 - 4. Elongation at Break: 300 percent, minimum, measured in accordance with ASTM D412.
 - 5. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.
 - 6. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.

7. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
8. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 200 feet head of water applied in accordance with test method ASTM D5385/D5385M.
9. Primers, Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
10. Products:
 - a. Carlisle Coatings & Waterproofing Inc; MiraDRI 860/861: www.carlisleccw.com/#sle.
 - b. Henry Company; Blueskin WP 200: www.henry.com/#sle.
 - c. W.R. Meadows, Inc; MEL-ROL: www.wrmeadows.com/#sle.

2.3 ACCESSORIES

- A. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.
- B. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.
 1. Composition: Dimpled polystyrene, polyethylene, or polypropylene core; polypropylene filter fabric.
 2. Thickness: As indicated on drawings.
 - a. Products:
 - 1) Advanced Building Products, Inc; ABP Advanced Drain Polymeric Drainage Mat: www.advancedbuildingproducts.com/#sle.
 - 2) Hyload, Inc; HyDrain 200: www.hyload.com/#sle.
 - 3) Carlisle Coatings and Waterproofing; MiraDrain 6000/6200: www.carlisleccw.com.
- C. Cant Strips: Premolded composition material.
- D. Self-Adhered Flashing: Composite membrane with top layer consisting of Ketone Ethylene Ester (KEE) reinforced membrane and backed by bottom layer of synthetic butyl adhesive covered with release paper.
 1. Overall Thickness: 35 to 45 mil, 0.035 to 0.045 inch, nominal.
- E. Flexible Flashings: Type recommended by membrane manufacturer.
- F. Counterflashings: Refer to Section 07 62 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00- Administrative Requirements: Coordination and project conditions
- B. Verify existing conditions are acceptable prior to starting work.
- C. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- D. Verify that items penetrating surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.

- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

3.3 INSTALLATION - MEMBRANE

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.
- D. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- G. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- H. Seal membrane and flashings to adjoining surfaces.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Upon completion of horizontal membrane installation, dam installation area in preparation for flood testing.
- C. Flood to minimum depth of 1 inch with clean water, and after 48 hours inspect for leaks.
- D. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test, and repair damage to building.
- E. When area is proven watertight, drain water and remove dam.

3.5 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

3.6 SCHEDULE

- A. Foundation Walls: One ply of membrane waterproofing; three plies at inside corners; adhesive applied.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, underside of floor slabs, over roof deck, over roof sheathing, and interior wall with facer providing exposed finish.
- B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
- B. Section 07 26 00 - Vapor Retarders: Separate vapor retarder materials.

1.3 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; 2019a.
- B. ASTM C240 - Standard Test Methods of Testing Cellular Glass Insulation Block; 2018.
- C. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).
- D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- G. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2019.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2019.
- K. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.5 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- C. Insulation Inside Masonry Cavity Walls: Polyisocyanurate board.
- D. Insulation Over Metal Stud Framed Walls, Continuous: Extruded polystyrene (XPS) board.
- E. Insulation on Inside of Framed Walls with Exposed Facer Providing Interior Finish: Rigid cellular polyisocyanurate with exposed facers.
- F. Insulation in Metal Framed Walls: Batt insulation with integral vapor retarder.
- G. Insulation Over Roof Deck: Extruded polystyrene (XPS) or Polyisocyanurate board.

2.2 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene Board Insulation: ASTM C 578, Type IV; Extruded polystyrene board cellular type surface; with the following characteristics:
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
 - 5. All Extruded Polystyrene Board Insulation shall be HFC free.
 - 6. Board Thickness: As noted on drawings.
 - 7. Board Edges: Square.
 - 8. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
 - 9. Products:
 - a. Dow Chemical Company: www.dowbuildingsolutions.com/#sle.
 - b. Kingspan Insulation LLC: www.trustgreenguard.com/#sle.
 - c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
- B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, comply with ASTM C1289.
 - 1. Classifications:
 - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
 - 1) Class 1 - Non-reinforced core foam.
 - 2) Compressive Strength: 16 psi, minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; 9.0, minimum, at 75 degrees F.

2. Water Vapor Permeance: 1.2 perm, maximum, at 1 inch thickness, and when tested in accordance with ASTM E96/E96M, desiccant method.
 3. Board Size: 48 inch by 96 inch.
 4. Board Thickness: 1.5 inch.
 5. Board Edges: Square.
- C. Rigid Cellular Polyisocyanurate (ISO) Thermal Insulation Board with Facers Both Sides and Providing Interior Finish System: Complying with ASTM C1289.
1. Compressive Strength: 16 psi, minimum.
 2. Thermal Resistance, R-value: Type I, Class 2, at 1-1/2 inch thick; 9.0, minimum, at 75 degrees F.
 3. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 4. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 5. Board Size: 48 inch by 96 inch.
 6. Board Thickness: 1 inch.
 7. Board Edges: Square.
 8. Exposed Facer: 4 mil, 0.004 inch embossed white thermoset-coated aluminum.
 9. Non-Exposed Facer: 1.25 mil, 0.00125 inch embossed aluminum.

2.3 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 3. Formaldehyde Content: Zero.
 4. Thermal Resistance: R-value of value indicated on drawings.
 5. Thickness: As indicated on drawings.
 6. Facing: Unfaced.
 7. Products:
 - a. CertainTeed Corporation: www.certainteed.com/#sle.
 - b. Johns Manville: www.jm.com/#sle.
 - c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 - d. Knauf Insulation GmbH: www.knaufinsulation.us.
 8. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 ACCESSORIES

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
1. Application: Sealing of interior circular penetrations, such as pipes or cables.
 2. Width: Are required for application.
- B. Self-Adhered Transition Flashing: Multipurpose, self-adhered flashing with modified butyl adhesive, polyester fiber top sheet, and polypropylene interlayer.
1. Application: Primerless adhesion for use as through-wall flashings and wall transitions to roof and below-grade systems.
 2. Thickness: 45 mil, 0.045 inch, nominal.
 3. Size: 6 inches wide, in rolls 75 feet long.
- C. Flashing Tape: Special reinforced film with high performance adhesive.
1. Application: Window and door opening flashing tape.
 2. Width: As required for application.
- D. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.

- E. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- F. Support for Cladding and Continuous Insulation: Thermal clips.
 - 1. Thermally-broken clips that provide attachment support for girts, angles, channels, and other cladding support framing.
 - 2. Galvanized Steel Support Clip: 14 gauge, 0.0747 inch, G90/Z275 galvanized support clip complying with ASTM A653/A653M, with integral glass fiber reinforced polyamide thermal isolator pad.
 - 3. Fasteners: As recommended by clip manufacturer.
- G. Support for Cladding and Continuous Insulation: Continuous thermal Z-girts.
 - 1. Fiberglass reinforced plastic (FRP) girts that provide cladding attachment support for exterior wall cladding, brick veneer, CMU veneer, metal wall panels, and siding.
 - 2. Fasteners: As recommended by clip manufacturer.
- H. Support for Cladding and Continuous Insulation: Thermal clip and rail.
 - 1. Fasteners: Provide support system and cladding attachment fasteners as recommended by system manufacturer in accordance with requirements.
- I. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Adhere a 6 inches wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
 - 1. Tape seal joints.
 - 2. Extend sheet full height of joint.
- B. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- C. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Extend boards over expansion joints, unbonded to foundation on one side of joint.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- F. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.
 - 1. Install boards horizontally from base of foundation to top of insulation.
 - 2. Butt boards tightly, with joints staggered from insulation joints.

3.3 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Adhere 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 - 1. Tape seal joints between sheets.
 - 2. Extend sheet full height of joint.
- B. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
 - 2. Full bed 1/8 inch thick.
- C. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches on center with manufacturer recommended mechanical fasteners, and tape joints with manufacturer's minimum 4 inches wide sealant tape; comply with ASTM E2357.
- D. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
- E. Extend boards over expansion joints, unbonded to wall on one side of joint.
- F. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- G. Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.
- H. Tape insulation board joints.

3.4 BOARD INSTALLATION AT CAVITY WALLS

- A. Secure impale fasteners to substrate at following frequency:
 - 1. Six (6) per insulation board.
- B. Adhere a 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 - 1. Extend sheet full height of joint.
- C. Install boards to fit snugly between wall ties.
 - 1. Place membrane surface facing out, and tape seal board joints.
- D. Install boards horizontally on walls.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- F. Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.

3.5 BOARD INSTALLATION USING CLADDING AND CONTINUOUS INSULATION SUPPORTS

- A. Install supports in accordance with manufacturer's installation instructions.
- B. Install supports in compliance with system orientation, sizes, and locations as indicated on drawings and in accordance with approved shop drawings.
- C. Install supports to fill in exterior wall spaces without gaps or voids in insulation.
- D. Trim insulation neatly to fit spaces and provide a continuous thermal layer.

3.6 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.7 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A. Board Installation Over Roof Deck, General:
 - 1. See applicable roofing specification section for specific board installation requirements.
 - 2. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
 - 3. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
 - 4. Do not apply more insulation than can be covered with roofing on the same day.

3.8 BOARD INSTALLATION OVER STEEP SLOPE ROOF SHEATHING OR ROOF STRUCTURE

- A. Installation of board insulation over steep slope roof structure or roof sheathing, see Section 06 10 00.

3.9 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Metal Framing: Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- G. Tape seal tears or cuts in vapor retarder.
- H. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.
- I. Coordinate work of this section with requirements for vapor retarder, see Section 07 26 00.
- J. Coordinate work of this section with construction of air barrier seal, see Section 07 27 00.

3.10 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.11 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water-resistive barriers.

1.2 DEFINITIONS

- A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

1.3 REFERENCE STANDARDS

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2019.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.5 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 WATER-RESISTIVE BARRIER MATERIALS

- A. Water-Resistive and Air Barrier, Multilayers: Outer layers of nonwoven, spunbonded polypropylene with vapor permeable, watertight polymeric middle layer.
 - 1. Air Permeance: 0.0011 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - 2. Water Vapor Permeance: 54 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F.
 - 3. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 3 months of weather exposure.
 - 4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.

5. Seam and Perimeter Tape: As recommended by sheet manufacturer.
6. Products:
 - a. SIGA Cover Inc; SIGA-Majvest 200: www.siga.swiss/global_en/#sle.

2.2 ACCESSORIES

- A. Sealants, Tapes, and Accessories Used for Sealing Water-Resistive Barrier and Adjacent Substrates: As indicated or complying with water-resistive barrier manufacturer's installation instructions.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
 1. Width: 4 inches.
- C. Thinners and Cleaners: As recommended by water-resistive barrier manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Water-Resistive Barriers: Install continuous water-resistive barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.
- C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.
- D. Mechanically Fastened Exterior Sheets:
 1. Install sheets shingle-fashion to shed water, with seams aligned horizontal.
 2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
 3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.
 4. Attach to framed construction with fasteners extending through sheathing into framing, and space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
 5. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
 6. Where stud framing rests on concrete or masonry substrate, extend lower edge of barrier sheets at least 4 inches below bottom of framing and seal to substrate with sealant or approved mounting tape.
 7. Install water-resistive barrier over jamb flashings.
 8. Install head flashings under water-resistive barrier.

9. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.

E. Self-Adhered Sheets:

1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle-fashion to shed water and seal laps airtight.
3. Upon placement of sheets, firmly press onto substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.

F. Openings and Penetrations in Exterior Water-Resistive Barriers:

1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Owner's Inspection and Testing: Cooperate with Owner's testing agency.
 1. Allow access to work areas and staging.
 2. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
 3. Do not cover work of this section until testing and inspection is accepted.
- C. Do not cover installed water-resistive barriers until required inspections have been completed.
- D. Obtain approval of installation procedures from water-resistive barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

3.5 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vapor retarders.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.

1.3 REFERENCE STANDARDS

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2019.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
- E. Testing agency qualification statement.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 VAPOR RETARDERS

- A. Underslab Vapor Retarders: See Section 03 30 00.
- B. Vapor Retarder Sheet: Butyl, black color.
 - 1. Thickness: 45 mil, 0.045 inch.
 - 2. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M.
 - 3. Seam Lap and Perimeter Adhesive: Elastomeric, same composition as sheet or other compatible material.
- C. Vapor Retarder, Self-Adhering Membranes:

1. Thickness: 40 mil, 0.04 inch, nominal.
 2. Vapor Retarder Class I: 0.1 perm or less, when tested in accordance with ASTM E96/E96M, Procedure A.
 3. System Accessory Products: As recommended by membrane manufacturer.
 4. Products:
 - a. Carlisle Coatings and Waterproofing; CCW-705 Air and Vapor Barrier Sheet: www.carlisleccw.com/#sle.
 - b. Carlisle Coatings and Waterproofing; CCW-705 Air and Vapor Barrier Strips: www.carlisleccw.com/#sle.
 - c. Henry Company; Blueskin SA: www.henry.com/#sle.
 - d. Henry Company; Blueskin SA LT (Low Temp): www.henry.com/#sle.
- D. Vapor Retarder Sheet: ASTM D1970/D1970M.
1. Type: Rubberized asphalt bonded to thermoplastic sheet, self-adhesive.
 2. Thickness: 40 mil, 0.040 inch, nominal.
 3. Sheet Width: 18 inches.
 4. Seam and Perimeter Tape: As recommended by sheet manufacturer.

2.2 ACCESSORIES

- A. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and vapor retarder materials.
1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch, nominal thickness.
 2. Color: Green.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M; slip resistance requirement waived if not installed on roof.
1. Width: 4 inches.
- C. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
1. Width: 3-1/2 inches.
 2. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 30 days of weather exposure.
- D. Sheet Membrane Mounting Tape: Double-sided strip of pressure-sensitive tape, acrylic adhesive reinforced with embedded fiber-strand carrier layer and plastic backing.
1. Width: 3/4 inch.
 2. Roll Length: 164 feet.
 3. Thickness: 14 mil, 0.014 inch.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.
- D. Self-Adhered Sheets:
 - 1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
 - 2. Lap sheets shingle fashion to shed water and seal laps airtight.
 - 3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
 - 4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
 - 5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.
- E. Openings and Penetrations in Exterior Vapor Retarders:
 - 1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto vapor retarder and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 - 3. At openings with nonflanged frames, seal vapor retarder to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
 - 4. At head of openings, install flashing under vapor retarder extending at least 2 inches beyond face of jambs; seal vapor retarder to flashing.
 - 5. At interior face of openings, seal gaps between window/door frame and rough framing using appropriate joint sealant over backer rod.
 - 6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of vapor retarder.

3.4 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 31 10
SYNTHETIC SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plastic shingles with slate appearance and texture.
- B. Recycled rubber shingles with slate appearance and texture.
- C. Flexible sheet membranes for eave protection, underlayment, and valley protection.
- D. Metal flashing.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Roof sheathing.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Edge and cap flashings.
- C. Section 07 71 23 - Manufactured Gutters and Downspouts.
- D. Section 07 92 00 - Joint Sealant.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.
- C. Shop Drawings: For metal flashings, indicate specially configured metal flashings, jointing methods and locations, fastening methods and locations, and installation details.
- D. Selection Samples: Submit color chips representing manufacturer's full range of available shingle colors and finishes.
- E. Verification Samples: Set of shingles representing actual product in color, finish, and style, including special shapes and fittings.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Mock-Up: Provide a mock-up for evaluation of shingle installation workmanship, including typical eave, rake, valley, and ridge details.
 - 1. Mock-Up Size: 4 by 4 feet, minimum.

2. Do not proceed with remaining work until workmanship has been approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.
4. Approved mock-up may be retained as part of this work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials with labels intact 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.

1.7 FIELD CONDITIONS

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide Manufacturer's Standard Warranty:
 1. Materials: Warrant shingles for 50 years against breakage or deterioration that results in leaks under normal weather and use conditions.
 2. Installation: Warrant total roof system, including underlayments, flashings, and other roof components for two years against water penetration.
- C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 SYNTHETIC SHINGLES

- A. Synthetic Shingles, Slate Texture: Shingles manufactured from 100 percent virgin plastic and approximating the appearance of traditional, natural slate.
 1. Fire Resistance: ASTM E108, Class A.
 2. Profile: Upper surface mimics appearance of natural slate, with integral alignment guides and nail holes.
 3. Width: 12 inches, nominal.
 4. Length: 18 inches, nominal.
 5. Thickness at Butt Edge: 1/2 inch, nominal.
 6. Coursing: Staggered.
 7. Color and Pattern: To be selected by Architect from manufacturer's full range. Match previous project. Aberdeen Blend (Basis of Design- Davinci)
 8. Products:
 - a. DaVinci Roofscapes, LLC; Multi-Width Slate: www.davinciroofscapes.com/#sle.

2.2 SHEET MATERIALS

- A. Underlayment: Asphalt-saturated organic roofing felt, unperforated, complying with ASTM D226/D226M, Type II, No. 30.
- B. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil, 0.040-inch total thickness, with strippable treated release paper and polyethylene sheet top surface.

2.3 METAL FLASHING

- A. Metal Flashing: Provide sheet metal eave edge, gable edge, ridge, ridge vents, open valley flashing, chimney flashing, dormer flashing, and other flashing indicated.
 - 1. Form flashings to profiles as indicated on drawings.
 - 2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
 - 3. Hem exposed edges of flashings minimum 1/4 inch on underside.
 - 4. Coat concealed surfaces of flashings with bituminous paint.

2.4 ACCESSORIES

- A. Roofing Nails: Standard round wire shingle type, galvanized steel, stainless steel, aluminum roofing nails, or copper roofing nails, minimum 3/8-inch head diameter, 12 gauge, 0.109 inch nail shank diameter, 1-1/2 inches long and complying with ASTM F1667/F1667M.
- B. Asphalt Roof Cement: ASTM D4586/D4586M, asbestos-free.
- C. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents.
- D. Bituminous Paint: Acid and alkali resistant type; black color.
- E. Ridge Vents: Plastic, extruded with vent openings that do not permit direct water or weather entry; flanged to receive shingles.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning this work.
- B. Verify that deck is of sufficient thickness to accept fasteners.
- C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- D. Verify roof openings are correctly framed.
- E. Verify deck surfaces are dry, free of ridges, warps, or voids.
- F. When substrate preparation is the responsibility of another installer or trade, notify Architect of unsatisfactory conditions before starting work.

3.2 PREPARATION

- A. Seal roof deck joints wider than 1/16 inch as recommended by shingle manufacturer.
- B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.
- C. Broom clean deck surfaces before installing underlayment or eave protection. Remove debris, loose fasteners, and other protrusions from deck surface.
- D. Install eave edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with roof cement. Secure flange with nails spaced 6 inches on center.

3.3 INSTALLATION

- A. Eave Protection Membrane:
 - 1. Install eave protection membrane from eave edge to minimum 4 feet up-slope beyond interior face of exterior wall.
- B. Underlayment:
 - 1. Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches; stagger end laps of each consecutive layer, nail in place, and weather lap minimum 4 inches over eave protection.
 - 2. Items Projecting Through or Mounted on Roof: Weather lap and seal watertight with plastic cement.
- C. Metal Flashing:
 - 1. Weather lap joints minimum 2 inches and seal weathertight with plastic cement.
 - 2. Secure in place with nails at 6 inches on center. Conceal fastenings.
 - 3. Items Projecting Through or Mounted on Roofing: Flash and seal weathertight with plastic cement.
- D. Shingles:
 - 1. Install shingles in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
 - 2. Place shingles in coursing pattern and with maximum weather exposure as indicated to produce double thickness over full roof area, and provide double course of shingles at eaves.
 - 3. Project first course of shingles 3/4 inch beyond fascia boards.
 - 4. Extend shingles 1/2 inch beyond face of gable edge fascia boards.
 - 5. Provide weathertight installation.

END OF SECTION

SECTION 07 56 00
FLUID-APPLIED ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fluid-applied roofing materials.
- B. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal parapet covers, copings, and counterflashings.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's data for membrane and accessory materials.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Include standard installation instructions, acceptable installation temperature range, and procedures for unusual perimeter conditions.
- F. Field Quality Control Test Report.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of fluid-applied roofing or waterproofing systems.
- B. Installer Qualifications: Company specializing in installation of fluid-applied roofing or waterproofing systems.

1.5 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide a new 20 year warranty for all new additions and roof areas, including roof edge, flashings, expansion joints and a total roof system warranty. Maintain current warranty for all infills, flashings, and modifications to the existing roof system.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fluid-Applied Roofing:
1. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon Tremco, Inc. products. Subject to compliance with requirements, provide the named product or an approved comparable product.
 - a. AlphaGuard BIO Fluid Applied Roof Restoration System by Tremco Inc. Contractor o maintain all current warnties and provide new warranty on all new roofing applications. Tremco Contact:
Justin Frye
Senior Field Advisor
Tremco CPG
Jfrye@tremcinc.com
908-910-4394

2.2 MATERIALS

- A. Fluid-Applied Roofing: White, cold-applied; single-component or two-component; polyurethane, solvent-based, asphalt-based, silicone elastomer, water-based acrylic elastomeric, or styrene-ethylene-butylene-styrene (SEBS), approved by manufacturer for permanent exposure to weather and sunlight.

2.3 ACCESSORIES

- A. Flexible Flashing Sheet: Neoprene or other elastic type sheets approved by roofing membrane manufacturer.
- B. Counterflashings: As recommended by roofing manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to starting this work.
- B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of roofing system.
- C. Verify that substrate surfaces are smooth, free of honeycombs or pitting, and not detrimental to full contact bond of roofing materials.
- D. Verify that roof openings, curbs, and items that penetrate surfaces to receive roofing materials are securely and properly installed.

3.2 PREPARATION

- A. Clean and prepare surfaces to receive roofing in accordance with manufacturer's instructions and recommendations.

- B. Seal cracks and non-moving open joints less than 1/2 inch wide with sealant using methods recommended by roofing and sealant manufacturers; do not seal expansion joints or moving joints of any width.
- C. Install cant strips at inside corners, where indicated and where required by roofing manufacturer.
- D. Protect adjacent surfaces not designated to receive roofing.

3.3 INSTALLATION

- A. Install fluid-applied roofing in accordance with manufacturer's instructions and recommendations, to specified minimum thickness.
- B. Apply roofing materials to surfaces that are acceptable to manufacturer.
- C. Apply primer or surface conditioner at a rate recommended by manufacturer, and protect surface conditioner from rain or frost until dry.
- D. Installations Over Sealant-Filled Joints: Install an extra coating of roofing material over joints at least 6 inches on each side of joint.
- E. Joint Cover Assembly: Install at expansion joints, moving joints 1/2 inch wide or wider, and joints between horizontal and vertical surfaces.
 - 1. Use flexible flashing sheet wide enough to extend 6 inches on both sides of joint with a loop of sheet extended down into the joint to a depth at least the width of the joint.
 - 2. Embed sheet in one coat of fluid-applied roofing material.
 - 3. Before installing the remainder of the roofing material, install a compressible joint sealer backer rod into joint above loop to prevent roofing material from filling loop.
- F. Penetrations: Unless otherwise indicated on drawings, or recommended by roofing manufacturer, seal flexible flashing sheet around penetrations and to roofing substrate prior to installation of roofing material, embedding flashing sheet in one coat of roofing material.
- G. Applying to Vertical Surfaces: Extend fluid-applied roofing material at least 6 inches above horizontal roofing surfaces.
- H. Embedded Flexible Flashing Sheet: Apply full thickness of roofing material over exposed flashing sheet.
- I. Roof Drains: Unless otherwise recommended by roofing manufacturer, set drain flange in one coating of roofing material and extend a full thickness of roofing material onto drain clamp flange, with adequate coating of roofing material to ensure waterproof seal of clamp ring.
- J. Apply extra thickness of roofing material at corners, intersections, and angles, when recommended by roofing manufacturer.
- K. Install counterflashing over exposed edges, where indicated on drawings.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Upon completion of horizontal fluid-applied roofing material installation, install dam at perimeter of installation area in preparation for flood testing.
- C. Flood area to a minimum depth of 1 inch with clean water, and after 72 hours, inspect for leaks.
- D. If leaking is found, remove water, repair leaking areas with new roofing materials as directed by Architect, and repeat flood test. Repair damages to building related to roof test leakage.

- E. When area is confirmed to be watertight, drain water and remove dam materials.

3.5 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must proceed over installed roofing materials, protect surfaces using durable materials acceptable to roofing material manufacturer.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule.

1.2 RELATED REQUIREMENTS

- A. Section 07 71 23 - Manufactured Gutters and Downspouts.

1.3 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- E. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- F. CDA A4050 - Copper in Architecture - Handbook; current edition.
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Perform work in accordance with ANSI/SPRI/FM 4435/ES-1 requirements for pull-off resistance to design wind pressure as defined by applicable local building code.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal, shop pre-coated with PVDF coating.
 - 1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As selected by Architect from manufacturer's standard colors.
- B. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 20 gauge, 0.032 inch thick; clear anodized finish.
 - 1. Color Anodized Finish: AAMA 611, AA-M12C22A42/44, Class I, integrally or electrolytically colored anodic coating not less than 0.7 mil, 0.0007 inch thick.

2.2 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches over roofing membrane. Return and brake edges.

2.3 GUTTERS AND DOWNSPOUTS

- A. Seal metal joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install scuppers to lines and levels indicated on Drawings. Seal top of reglets with sealant
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.3 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Seal metal joints watertight.
- E. Secure gutters and downspouts in place with concealed fasteners.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 71 00
ROOF SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufactured roof specialties, including copings, fascias, and gravel stops.
- B. Roof control and expansion joint covers.

1.2 RELATED REQUIREMENTS

- A. Section 07 72 00 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

1.3 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.
- D. NRCA (RM) - The NRCA Roofing Manual; 2019.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Samples: Submit two appropriately sized samples of coping and fascia.
- E. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

1.5 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish manufacturer's material and labor warranty to cover degradation of material finish.
 - 1. Term: Ten years after Date of Substantial Completion.
 - 2. Coverage: include color fading due to exposure to weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Roof Edge Flashings and Copings:
 - 1. Carlisle Syntec Systems: www.carlislesyntec.com.
 - 2. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
 - 3. Metal-Era Inc: www.metalera.com/#sle.
- B. Control and Expansion Joint Covers:
 - 1. GAF: www.gaf.com/#sle.
 - 2. Johns Manville: www.jm.com/#sle.
 - 3. MM Systems Corp: www.mmsystemscorp.com/#sle.
- C. Counterflashings:
 - 1. Tremco, Inc..

2.2 COMPONENTS

- A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
 - 1. Configuration: Fascia, and edge securement for roof membrane. Concealed continuous heavy duty extruded aluminum cleat with snap-on aluminum fascia; internal splice piece at joints of same material, thickness and finish as fascia; concealed stainless steel fasteners.
 - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
 - 3. Material: Formed aluminum sheet, 0.050 inch thick, minimum.
 - 4. Finish: 70 percent polyvinylidene fluoride.
 - 5. Color: As selected by Architect from manufacturer's standard range.
 - 6. Products:
 - a. Tremlock Fascia Edge System (Tremco), Basis of Design and current roof manufacturer.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
 - 1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners. Include special supports spaced at 32 inches on center.
 - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
 - 3. Material: Formed aluminum sheet, 0.050 inch thick, minimum.
 - 4. Finish: 70 percent polyvinylidene fluoride.
 - 5. Color: As selected by Architect from manufacturer's standard range.
 - 6. Products:
 - a. Tremlock Coping Edge System (Tremco), Basis of Design and current roof manufacturer.
- C. Control and Expansion Joint Covers: Composite construction of 4-inch wide flexible EPDM flashing of white color with closed cell urethane foam backing, each edge seamed to aluminum sheet metal flanges, designed for nominal joint width of 1 inch. Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.

- D. Reglet and Counterflashings:
 - 1. .040 extruded aluminum reglet with .032 formed aluminum counter flashing with stainless steel spring clips at 16" o.c. and stainless steel wind clips at 32" o.c.
 - a. Finish of both reglet and counterflashing to be kynar paint.
- E. Pipe Boots: Provide boot of material compatible with new roof system.
 - 1. Provide retrofit boot for existing pipes.
 - 2. Products: Pipe boot (new roof system) and retrofit pipe seals (existing roof system)
- F. Multi-Pipe Portal System: Provide curb or base flange with rubber cap which will accept the size and number of pipes and/or conduit required. Materials are to be compatible with new roof system.
 - 1. Product: Provide boot similar to Quadraseal by Portals Plus, Inc.
- G. Counterflashings: Factory fabricated and finished sheet metal that overlaps top edges of base flashing by at least 4 inches, and designed to snap into through-wall flashing or reglets with lapped joints.

2.3 FINISHES

- A. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mil, 0.0007 inch thick.
- B. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

2.4 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Fasteners: Stainless Steel with same finish as flashing metal & soft neoprene washers (no exposed fasteners). Fasteners for roof replacements must be included in the Singly-Ply Roofing membrane manufacturer's warranty to meet uplift pressures determined in accordance with the applicable Building Code.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.
- B. Field verify dimensions of metal fascia and coping. Verify adequate coverage of existing blocking and wall surface. Minimum of 2 inch lap required.

3.2 INSTALLATION

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Conform to SMACNA Architectural Sheet Metal Manual drawing details.
- E. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

- F. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.
- G. Coordinate installation of flashing flanges into reglets.

END OF SECTION

SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-finished aluminum gutters and downspouts.
- B. Precast concrete splash pads.
- C. Sheet metal splash pans.

1.2 RELATED REQUIREMENTS

- A. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.3 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Comply with applicable code for size and method of rain water discharge.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Samples: Submit two samples, 6 inch long illustrating component design, finish, color, and configuration.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

1.7 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for gutter and downspout finishes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Gutters and Downspouts:
 - 1. ATAS International, Inc; Water Control System: www.atas.com/#sle.
 - 2. Metal Era Roof Edge Systems
 - 3. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc: www.saf.com/persys/#sle.

2.2 MATERIALS

- A. Heavy Duty, Commercial Grade- Pre-Finished Aluminum Sheet: ASTM B209M; 0.032 inch thick.
 - 1. Finish: Plain, shop pre-coated with modified silicone coating.
 - 2. Color: As selected from manufacturer's standard colors.
- B. Primer: Zinc molybdate type.

2.3 COMPONENTS

- A. Gutters: CDA rectangular style profile.
- B. Downspouts: CDA rectangular profile.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
- D. Fasteners: Galvanized steel, with soft neoprene washers.

2.4 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FINISHES

- A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604, multiple coat, thermally cured fluoropolymer finish system; custom color to match approved sample.

2.6 ACCESSORIES

- A. Splash Pads: Precast concrete type, profiles size(s) as indicated; minimum 3,000 psi compressive strength at 28 days, with minimum 5 percent air entrainment.
- B. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots and on-body cleanout and cover with neoprene gaskets.
 - 1. Configuration: Angular.
 - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
 - 3. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, and rubber coupling.
 - 4. Products:
 - a. Downspoutboots.com/#sle., a division of J. R. Hoe & Sons:
www.downspoutboots.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

3.2 PREPARATION

- A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.3 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/8 inch per foot .
- D. Connect downspouts to downspout boots at 4 inches above grade. Seal connection watertight.
- E. Set splash pans under downspouts. Secure in place

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof curbs.
- B. Equipment rails.
- C. Roof penetrations mounting curbs.

1.2 RELATED REQUIREMENTS

- A. Section 07 71 00 - Roof Specialties: Other manufactured roof specialty items.

1.3 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
- D. Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

PART 2 PRODUCTS

2.1 ROOF CURBS

- A. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
 - 2. Sheet Metal Material:

- a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
 3. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
 - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
 - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
 - c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
 - d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
 4. Provide layouts and configurations indicated on drawings.
- B. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
1. Height Above Finished Roof Surface: 8 inches, minimum.
- C. Equipment Support: Straight curbs on each side of equipment, with top of curbs parallel with metal roofing system and each other for equipment mounting.
- D. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches square unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.4 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 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.2 RELATED REQUIREMENTS

- A. Section 01 35 17 - Alteration Project Procedures: Cutting and patching.
- B. Section 07 05 53 - Fire and Smoke Assembly Identification.

1.3 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2019.
- 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 E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013 (Reapproved 2017).
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- F. ITS (DIR) - Directory of Listed Products; current edition.
- G. FM (AG) - FM Approval Guide; current edition.
- H. UL (DIR) - Online Certifications Directory; Current Edition.
- I. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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 Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by manufacturer.
 - 2. With minimum ten years documented experience installing work of this type.

1.6 MOCK-UPS

- A. Install one firestopping assembly representative of each fire rating design required on project.
 - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
- B. If accepted, mock-up will represent minimum standard for this work.
- C. If accepted, mock-up may remain as part of this work. Remove and replace mock-ups not accepted.

1.7 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products: www.3m.com/firestop.
 - 2. A/D Fire Protection Systems Inc: www.adfire.com.
 - 3. Hilti, Inc: www.us.hilti.com.
 - 4. Specified Technologies Inc: www.stifirestop.com/#sle.
 - 5. RectorSeal: www.rectorseal.com
 - 6. United States Gypsum Co.
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

2.3 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
- B. 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. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 - 2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
 - 3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
 - 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.4 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. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
 - a. 2 Hour Construction: UL System HW-D-0755; 3M Co.; FireDam Spray 200.
- B. Gypsum Board Walls:
 - 1. Head-of-Wall Joints at Concrete Over Metal Deck:
 - a. 1 Hour Construction: UL System HW-D-0101, 3M Co.; FireDam Spray 200.

2.5 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

- A. Blank Openings:
 - 1. In Floors or Walls:
 - a. 2 Hour Construction: UL System C-AJ-0032; USG Inc.; Firecode Compound.
- B. Penetrations Through Floors or Walls By:
 - 1. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-1081; USG Inc.; Firecode Compound.
 - 2. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-22015; Rectorseal Sealant.
 - 3. Electrical Cables Not In Conduit:
 - a. 3 Hour Construction: UL System C-AJ-3231; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
 - b. 2 Hour Construction: UL System C-AJ-3045; USG Inc.; Firecode Compound.
 - 4. Insulated Pipes:
 - a. 2 Hour Construction: UI System C-AJ-5002; 3M Company FS-195+ / CP 25WB+
 - 5. HVAC Ducts, Uninsulated:
 - a. 2 Hour Construction: UL System C-AJ-7036; Rectorseal Sealant

2.6 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 - 1. 1 Hour Construction: UL System W-L-0031; 3M Company CP 25WB+
- B. Penetrations By:
 - 1. Uninsulated Metallic Pipe, Conduit, and Tubing:

- a. 2 Hour Construction: UL System W-L-1001; 3M Company CP 25WB+
2. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System W-L-2088; 3M Company CP 25WB+ / FB-3000 WT
3. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System W-L-3218; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
 - b. 1 Hour Construction: UL System W-L-3218; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
 - c. 1 Hour Construction: UI System W-L-3195; 3M Company CP 25WB+
4. Insulated Pipes:
 - a. 1 Hour Construction: UL System W-L-5039; 3M Company CP 25WB+
5. HVAC Ducts, Insulated:
 - a. 1 Hour Construction: UL System W-L-7082; Rectorseal Sealants.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.2 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.

3.3 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.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements.
- B. See Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- C. Inspect installed firestopping for compliance with specifications and submitted schedule.
- D. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.5 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.6 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 92 00
JOINT SEALANT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.3 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.
- C. ASTM C834 - Standard Specification for Latex Sealants; 2017.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- G. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
- H. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015, with Editorial Revision (2017).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include 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. Backing material recommended by sealant manufacturer.
 - 4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 5. Substrates the product should not be used on.
 - 6. Substrates for which use of primer 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.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- G. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- H. Field Quality Control Log: Submit filled-out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.
- I. Manufacturer's qualification statement.
- J. Installer's qualification statement.
- K. Executed warranty.

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 the work of this section and with at least three years of documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 1. Adhesion Testing: In accordance with ASTM C794.
 2. Compatibility Testing: In accordance with ASTM C1087.
 3. Allow sufficient time for testing to avoid delaying the work.
 4. Deliver sufficient samples to manufacturer for testing.
 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
- E. Field Quality Control Plan:
 1. Visual inspection of entire length of sealant joints.
 2. Field testing agency's qualifications.
 3. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. **Manufacturer Warranty:** Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 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:
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 - 2. **Interior Joints:** Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Other joints indicated below.
- B. **Exterior Joints:** Use nonsag nonstaining silicone sealant, unless otherwise indicated.
 - 1. **Lap Joints in Sheet Metal Fabrications:** Butyl rubber, noncuring.
 - 2. **Control and Expansion Joints in Concrete Paving:** Self-leveling polyurethane traffic-grade sealant.
 - 3. **Wiring Slots in Concrete Paving:** Self-leveling epoxy sealant.
 - 4. **Cooling Tower and Fountain Basins:** Nonsag polyurethane sealant for continuous immersion.
- C. **Interior Joints:** Use nonsag polyurethane sealant, unless otherwise indicated.
 - 1. **Wall and Ceiling Joints in Nonwet Areas:** Acrylic emulsion latex sealant.
 - 2. **Wall and Ceiling Joints in Wet Areas:** Nonsag polyurethane sealant for continuous liquid immersion.
 - 3. **Floor Joints in Wet Areas:** Nonsag polyurethane non-traffic-grade sealant suitable for continuous liquid immersion.
 - 4. **Wall, Ceiling, and Floor Joints Where Tamper-Resistance is Required:** Non-sag tamper-resistant silyl-terminated polyurethane sealant.
 - 5. **Joints between Tile in Wet Areas and Floors, Walls, and Ceilings:** Mildew-resistant silicone sealant; white.
 - 6. **In Sound-Rated Assemblies:** Acrylic emulsion latex sealant.
 - 7. **Narrow Control Joints in Interior Concrete Slabs:** Self-leveling epoxy sealant.
 - 8. **Other Floor Joints:** Self-leveling polyurethane traffic-grade sealant.
- D. **Interior Wet Areas:** Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
- E. **Sound-Rated Assemblies:** Walls and ceilings identified as STC-rated, sound-rated, or acoustical.
- F. **Areas Where Tamper-Resistance is Required:** As indicated on drawings.

2.2 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 61 16.

2.3 NONSAG JOINT SEALANTS

- A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
 - 5. Color: To be selected by Architect from manufacturer's full range.
 - 6. Products:
 - a. Dow; DOWSIL 795 Silicone Building Sealant: www.dow.com/#sle.
 - b. Sika Corporation; Sikasil 728NS: www.usa.sika.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Tremsil 600: www.tremcosealants.com/#sle.
- B. 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.
 - 2. Products:
 - a. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
 - b. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Tamper-Resistant, Silyl-Terminated Polyurethane (STPU) Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum
 - 2. Hardness Range: 25 to 30, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Products:
 - a. Pecora Corporation; DynaFlex SC (Security Sealant): www.pecora.com/#sle.
 - b. Sika Corporation; SikaHyflex-150 LM: www.usa.sika.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; multi-component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's full range.
 - 4. Products:
 - a. Master Builders Solutions; MasterSeal NP1: www.master-builders-solutions.com/en-us/#sle.
 - b. Pecora Corporation; DynaFlex: www.pecora.com/#sle.
 - c. Sika Corporation; Sikaflex-2c NS: www.usa.sika.com/#sle.
 - d. Tremco Commercial Sealants & Waterproofing; Vulkem 116: www.tremcosealants.com/#sle.

- E. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multicomponent; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
 - 1. Movement Capability: Plus and minus 35 percent, minimum.
 - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Products:
 - a. Sika Corporation; Sikaflex-2c NS: www.usa.sika.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

- F. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
 - 1. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Products:
 - a. Master Builders Solutions; MasterSeal NP 520: www.master-builders-solutions.com/en-us/#sle.
 - b. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Tremstop Smoke and Sound Spray: www.tremcosealants.com/#sle.

- G. Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.
 - 1. Products:
 - a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: www.pecora.com/#sle.
 - b. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant: www.tremcosealants.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 SELF-LEVELING JOINT SEALANTS

- A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Provide slope grade sealant at all sloped pavement up to 12%.
 - 5. Products:
 - a. Pecora Corporation: www.pecora.com/#sle.
 - b. Sherwin-Williams Company; Stampede 2SL Polyurethane Sealant: www.sherwin-williams.com/#sle.
 - c. Sika Corporation; Sikaflex-2c SL: www.usa.sika.com/#sle.

- B. Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Color: To be selected by Architect from manufacturer's standard range.
 - 3. Provide slope grade sealant at all sloped pavement up to 12%.
 - 4. Products:
 - a. Sika Corporation; Sikaflex-2c SL: www.usa.sika.com/#sle.
 - b. W. R. MEADOWS, Inc; POURTHANE SL: www.wrmeadows.com/#sle.

- C. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.

1. Composition: Multicomponent, 100 percent solids by weight.
2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
3. Color: To be selected by Architect from manufacturer's standard colors.
4. Joint Width, Minimum: 1/8 inch.
5. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.
6. Products:
 - a. Euclid Chemical Company; EUCO 700: www.euclidchemical.com/#sle.
 - b. Mapei; Mapeiflex Joint Sealant EP 90/50: www.mapei.com/#sle.
 - c. W.R. Meadows, Inc; Rezi-Weld Flex: www.wrmeadows.com/#sle.

2.5 ACCESSORIES

- A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.
- B. 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.
- C. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- D. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- E. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- F. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.1 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.

3.2 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.

3.3 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Install bond breaker backing tape where backer rod cannot be used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- E. 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.
- F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- G. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.5 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Fire-rated hollow metal doors and frames.
- C. Fire-rated hollow metal frames for fire walls
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.
- F. Independent testing agency requirements for Fire Door Inspection and testing to be completed on existing doors and frames.

1.2 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

1.3 REFERENCE STANDARDS

- A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- B. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- F. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- G. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- H. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials,
- I. ITS (DIR) - Directory of Listed Products; current edition.
- J. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.
- K. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- L. NFPA 101-2018 - Life Safety Code; 2018.
- M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- N. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.

- O. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- P. UL (DIR) - Online Certifications Directory; Current Edition.
- Q. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- R. UL 263 - Standard for Fire Tests of Building Construction and Materials.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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; and one copy of referenced standards/guidelines.
- C. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.
- C. Fire Rated Frame Construction:
 - 1. Conform to one of the following:
 - a. NFPA 252 with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - b. ASTM E119 or UL 263
 - c. UL 10C.
 - 2. Installed fire rated frame assembly shall conform to NFPA 80 for fire rated class same as fire door.
 - 3. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.

1.6 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

2.1 MANUFACTURERS

- A. Steel Frames:
 - 1. Assa Abloy Curries; Product "M" Series: www.assaabloydss.com.
 - 2. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 3. Fenestra Corp .

4. Kewanee Corp.; Product F-Line Frames: www.kewaneecorp.com.
5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Steel Doors:

1. Assa Abloy Curries; Product Series 747: www.assaabloydss.com.
2. Fenestra Corp; Product Presidential "W" Series (interior) or "E" Series (exterior).
3. Kewanee Corp; Product D-Series Full Flush Seamless Door: www.kewaneecorp.com.
4. Republic Builders Products.
5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. 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.

2.3 HOLLOW METAL DOORS

A. Type 1, Exterior Doors: Thermally insulated.

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 1 - Standard-duty.
 - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thermal Resistance: R-Value of 11.9.
4. Door Thickness: 1-3/4 inches, nominal.

B. Type 2, Interior Doors, Non-Fire Rated:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 1 - Standard-duty.
 - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
2. Core: Vertical steel stiffeners with fiberglass batting.
3. Door Thickness: 1-3/4 inches, nominal.

C. Type 3, Fire-Rated Doors:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 1 - Standard-duty.
 - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 20 gauge, 0.032 inch, minimum.
2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - a. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - b. Attach fire rating label to each fire rated unit.
3. Door Thickness: 1-3/4 inches, nominal.

2.4 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
 - 1. Fabricate frames with hardware reinforcement plates welded in place.
 - a. Hinge: Min. 7 gauge x 1 5/8 x 10 inches.
 - b. Lock Strike: Minimum 14 gauge x template requirements.
- B. Exterior Door Frames: Full profile/continuously welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - 2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
 - 3. Frame Finish: Factory primed and field finished.
 - 4. Weatherstripping and Threshold required: Separate, see Section 08 71 00.
- C. Interior Door Frames, Non-Fire Rated: Knock-down type.
 - 1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
 - 2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
 - 3. Frame Finish: Factory primed and field finished.
- D. Door Frames, Fire-Rated: Knock-down type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
 - 3. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
 - 4. Frame Finish: Factory primed and field finished.
- E. Mullions for Pairs of Doors: Fixed, with profile similar to jambs.
- F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- G. Transom Bars: Fixed, of profile same as jamb and head.

2.5 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
 - 1. Fire-Rated Frames: Comply with fire rating requirements indicated.

2.6 ACCESSORIES

- A. Glazing: As specified in Section 08 80 00.
- B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- C. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- D. Silencers: Specified in Section 08 71 00. Resilient vinyl, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- E. Anchors:
 - 1. Stud Wall: Steel stud anchor.

2. New Masonry: Adjustable masonry strap anchor.
3. Existing Masonry: Counter sunk screw with sleeve.
 - a. Counter sunk fasteners shall be covered with a suitable hard setting filling compound, sanded and finished to match frame.

2.7 EXISTING DOOR AND/OR FRAME ASSEMBLY FIRE INSPECTIONS

- A. Independent testing agency requirements for fire rating inspections at existing doors and/or frames:
 1. Acceptable Testing Agencies: Guardian Testing Lab, 399 Prospect Avenue Buffalo, NY 14201-1139; www.firetesting.com.
 2. Doors and/or frames to be field tested in accordance with NFPA 101, ASTM E-119 and E152.
 3. Provide labels on doors and frames to state the acceptable fire rating requirement.
 4. See schedule on drawings for required locations.

PART 3 EXECUTION

3.1 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.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 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 frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Coordinate installation of hardware specified in Section 08 71 00.
 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- F. Coordinate installation of glazing specified in Section 08 80 00.
- G. Coordinate installation of electrical connections to electrical hardware items.

3.4 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 measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire rated and non-rated.

1.2 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

- A. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- B. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Full size door sample: Contractor to furnish one complete door unit at each project location to be randomly core sampled. Door to be selected by Architect in field. Door to be sampled would have similar hardware type to other doors to be provided.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Warranty, executed in Owner's name.

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. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Masonite Architectural: www.architectural.masonite.com/#sle.
 - 2. VT Industries, Inc: www.vtindustries.com/#sle.

2.2 DOORS AND PANELS

- A. Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

2.3 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.4 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Species to match existing, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Same species as face veneer.
 - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
 - 3. Veneer to be hot press applied to core.

2.5 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Fit door edge trim to edge of stiles after applying veneer facing. No exposed cross banding.
- D. Bond edge banding to cores.

- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- G. Provide edge clearances in accordance with the quality standard specified.

2.6 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with same sealer to match door facing.

2.7 ACCESSORIES

- A. Glazing Stops for non-rated doors: Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.
- B. Glazing Stops for secured non-rated doors: Rolled steel channel shape, 18 gauge, 0.047 inch; no exposed fasteners on non-secure side.
- C. Glazing Stops for Fire Rated Doors: Metal as required by manufacturer to achieve fire rating.
- D. Astragals and Edges for Double Doors: Pairs of doors astragals, and door edge sealing and protection devices.
 - 1. UL listed products in compliance with requirements of authorities having jurisdiction.
 - 2. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.
- E. Door Hardware: See Section 08 71 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements and to requirements for fire rating label by UL or WH. Follow manufacturer's installation instructions for positive pressure doors.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.3 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall- and ceiling-mounted access units.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry: Openings in masonry.
- B. Section 09 21 16 - Gypsum Board Assemblies: Openings in partitions.
- C. Section 09 91 23 - Interior Painting: Field paint finish.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- C. 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.
- D. ITS (DIR) - Directory of Listed Products; current edition.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- F. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.
- E. Project Record Documents: Record actual locations of each access unit.

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 and with at least three years documented experience.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Access door and frame units, fire-rated and non-fire-rated, in wall and ceiling locations.
 - 1. Provide for access to controls, valves, traps, dampers, cleanouts, and similar items requiring operation behind inaccessible finished surfaces.
 - 2. Coordinate exact locations with various trades to assure proper placement of access doors and panels.
- B. Wall-Mounted Units:
 - 1. Location: As indicated on drawings, and additional locations as required.
 - 2. Panel Material: Steel.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
- C. Fire-Rated Wall-Mounted Units:
 - 1. Location: As indicated on drawings, and additional locations as required.
 - 2. Wall Fire-Rating: To match rating of assembly in which unit is installed .
 - 3. Panel Material: Steel.
 - 4. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- D. Ceiling-Mounted Units:
 - 1. Location: As indicated on drawings, and additional locations as required.
 - 2. Panel Material: Steel.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.2 WALL- AND CEILING-MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. ACUDOR Products Inc: www.acudor.com/#sle.
 - 2. Cendrex, Inc: www.cendrex.com/#sle.
 - a. Wall- and Ceiling-Mounted Units: Cendrex AHD, flush door, face frame, hinged.
 - b. Fire-Rated Wall-Mounted Units - 2 Hours or Less: Cendrex PFI series, insulated.
 - c. Fire-Rated Ceiling-Mounted Units: Cendrex PFI series, downward opening.
 - 3. Karp Associates, Inc: www.karpinc.com/#sle.
 - 4. Milcor, Inc: www.milcorinc.com.
 - 5. Nystrom, Inc: www.nystrom.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. Style: Exposed frame with door surface flush with frame surface.
 - a. Gypsum Board Ceiling Mounting Criteria: Use drywall bead type frame.
 - 2. Door Style Non-rated: Single thickness with rolled or turned in edges.
 - 3. Door Style Fire-Rated: Double-skinned hollow panel, insulated.
 - a. Insulation: Non-combustible mineral wool.
 - 4. Frames: 16-gauge, 0.0598-inch minimum thickness.
 - 5. Single Steel Sheet Door Panels: 16 gage, minimum thickness.
 - 6. Double-Skinned Hollow Steel Sheet Door Panels: 20 gage, .0359 inch, minimum thickness, on both sides and along each edge.
 - 7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.

- a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
- b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
8. Steel Finish: Primed.
9. Factory Primed: Polyester powder coat.
10. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
 - c. Latch/Lock: Screw driver slot for quarter turn cam latch.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.

PART 3 EXECUTION

3.1 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.

3.2 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.

3.3 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings with plane of door and panel face aligned with adjacent finished surfaces. Secure rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.
- D. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

END OF SECTION

SECTION 08 33 23
OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire-rated coiling doors.
- B. Electric operators and control stations.
- C. Wiring from electric circuit disconnect to operators and control stations.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealant: Sealing joints between frames and adjacent construction.
- B. Section 08 71 00 - Door Hardware: Cylinder cores and keys.
- C. Section 26 05 33.13 - Conduit for Electrical Systems: Conduit from fire alarm system.
- D. Section 26 05 83 - Wiring Connections: Power to disconnect.

1.3 REFERENCE STANDARDSUL 723

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- D. ITS (DIR) - Directory of Listed Products; current edition.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- F. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000, with Errata (2008).
- G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- H. UL (DIR) - Online Certifications Directory; Current Edition.
- I. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- J. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide general construction, electrical equipment, and component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.5 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified and indicated.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide five-year manufacturer warranty for three-ply multifilament polyester fabric curtain. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Overhead Coiling Doors:
 - 1. Cornell Iron Works, Inc: www.cornelliron.com/#sle.
 - 2. Raynor Garage Doors: www.raynor.com/#sle.
 - 3. Overhead Door Corp: www.overheaddoor.com.

2.2 COILING DOORS

- A. Fire-Rated Coiling Doors: Steel slat curtain; comply with NFPA 80.
 - 1. 2 hour fire rating.
 - 2. Provide products listed and labeled by ITS (DIR) or UL (DIR) as suitable for purpose specified and indicated on drawings.
 - 3. Oversized Openings: Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated units and operating hardware assembly.
 - 4. Single Thickness Slats: Manufacturer's standard.
 - 5. Nominal Slat Size: 2 inches wide by required length.
 - 6. Finish: Primed.
 - 7. Finish: Factory painted, color as selected.
 - 8. Guides, Angles: Stainless steel.
 - 9. Hood Enclosure: Manufacturer's standard; primed steel.
 - 10. Coiling Door Release Mechanism: Fire alarm system activated with automatically governed closing speed.
 - 11. Door must be resettable from the floor following fire alarm activation.
 - 12. Fire Alarm Release Mechanism: Electric-motor operated from fire alarm system and local heat or smoke detectors.
 - 13. Electric operation and switch system.
 - 14. Mounting: Within framed opening.
 - 15. Locking Devices: Lock and latch handle on outside.

2.3 MATERIALS AND COMPONENTS

- A. Metal Curtain Construction: Interlocking slats.

1. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.
2. Weatherstripping for Exterior Doors: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
- B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.
 1. Stainless Steel: ASTM A 666, Type 304, rollable temper.
- D. Hood Enclosure and Fascia: Internally reinforced to maintain rigidity and shape.
 1. Prime painted.
- E. Lock Hardware:
 1. Furnish locks to allow doors to be secured.
 2. Lock Cylinders: six pin type; keyed master keyed. Furnished under Section 08 71 00, installed as part of Work of this section.
 - a. Cylinder dead lock on inside ar door jamb, key operated from exterior; interior latch release mechanism.
 3. For motor operated units, additional lock or latching mechanisms are not required.
 4. Latching Mechanism: Inside mounted, adjustable keeper, spring activated latch bar feature to keep in locked or retracted position.
 5. Latch Handle: Manufacturer's standard.

2.4 ELECTRIC OPERATION

- A. Electric Operators:
 1. Mounting: Side mounted.
 2. Motor Enclosure:
 3. Motor Rating: 1/3 HP; continuous duty.
 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 6. Controller Enclosure: NEMA 250, Type 4.
 7. Opening Speed: 12 inches per second.
 8. Brake: Manufacturer's standard type, activated by motor controller.
 9. Manual override in case of power failure.
 10. See Section 26 05 83 for electrical connections.
- B. Control Station: Provide standard three button, "Open-Close-Stop" momentary-contact control device for each operator complying with UL 325.
 1. 24 volt circuit.
 2. Surface mounted, at interior door jamb.
 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. When any safety device encounters an obstruction, door will automatically retract to the open position. The system shall attempt to close a maximum of three times. If the obstruction remains after the third attempt, the door shall close to the height of the obstruction and remain closed at that position.
 - b. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
- C. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that adjacent construction is suitable for door installation.
- B. Verify that electrical services have been installed and are accessible.
- C. Verify that door opening is plumb, header is level, and dimensions are correct.
- D. Notify Architect of any unacceptable conditions or varying dimensions.
- E. Commencement of installation indicates acceptance of substrate and door opening conditions.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install fire-rated doors in accordance with NFPA 80.
- C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- F. Coordinate installation of electrical service with Section 26 05 83.
- G. Complete wiring from disconnect to unit components.
- H. Complete wiring from fire alarm system.
- I. Install enclosure and perimeter trim.

3.3 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.4 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.
- B. Test smoke activated assemblies for proper activation.

3.5 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.

1.2 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 07 92 00 - Joint Sealant: Sealing joints between frames and adjacent construction.
- C. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 4x4 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Submit NFRC 100- CMA Bid Report for the project showing compliance with the project thermal requirements at time of initial submission. Bid report shall be based on NFRC test sizes utilizing project specific glazing.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of New York.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Single Source Requirement: Unless otherwise indicated, obtain aluminum doors and storefront from a single company specializing in the type of construction required so that there will be undivided responsibility for the specified performance of all component parts. Manufacturer to fabricate storefront frames to greatest extent allowing for minimal field fabrication.
- D. Hardware Attachment Fasteners: All hardware to be attached using machine fasteners only. Use of thread forming fasteners is not acceptable.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Warrant doors, storefront frames and factory supplied hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation and deterioration in finish or construction in excess of normal weathering.
- C. Hardware Attachment: The workmanship and materials involved with the installation of hardware by the door manufacturer is guaranteed to be free of defects. Door Manufacturer

shall install all hardware, except door closers. Hardware supplied with doors and frames shall be covered by the hardware manufacturer's standard warranty.

D. Warranty Terms:

1. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
2. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
3. Provide Ten year warranty on attachment of factory installed hardware.
4. Cover complete system for failure to meet requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aluminum-Framed Storefronts:

1. Boyd Aluminum: www.boydaluminum.com/#sle.
2. EFCO, a Pella Company: www.efcocorp.com.
3. Manko Window Systems, Inc: www.mankowindows.com/#sle.

2.2 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Unitized, shop assembly.
2. Glazing Position: center.
3. Finish: Class I color anodized.
4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
10. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel, and heel bead of glazing compound.
11. Thermal Performance: Installed system shall conform to the following minimum standards:
 - a. Fabricator will be required to thermally model each head, sill and jamb, including adjacent construction, using thermal computer modeling software by an NFRC certified simulator to conform to the following:
 - b. Inside air temperature of 72 degrees F at 30 percent RH and an outside air temperature of -10 degrees F with a 15 mph wind speed.

- c. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.
- B. Performance Requirements
1. Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load or loads based on 120 mph wind speed, whichever is greater.
 - a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Overall U-Value Including Glazing: .36 Btu/ sq ft per hour per degree F, maximum, based on glass/spacer per specification section 08 80 00, and based on NFRC 100 sizes. Labeled and certified by manufacturer.
 - a. Provide CMA NFRC Label certificate at close out of project.
 - b. Provide CMA Bid Report as submittal prior to release to verify compliance.
 - c. All testing shall be completed using specified glazing.
 - d. CMA Report is for framing only, not the entrance doors.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Door stops: Supply screw applied door stops of .625-inch height with pile weather strip. At closer shoe location provide 1/2-inch solid aluminum bar stock for secure hardware attachment.
 4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel members as required.
 5. Supply expansion mullions as required to accommodate seasonal expansion and contraction of systems.
 6. Manufacturer to fabricate storefront frames to greatest extent possible.
- B. Swing Doors: Glazed aluminum.
1. Manufacturer - Same as storefront.
 2. Thickness: 1-3/4 inches.
 3. Face Sheet Thickness: 0.125 inches.
 4. Top Rail: 6 1/2 inches wide.
 5. Vertical Stiles: 4 3/4 inches wide.
 6. Bottom Rail: 10 inches wide.
 7. Mid-Rail: 8 inches wide.
 8. Glazing Stops: Exterior glass stop shall be vandal resistant integral to stiles and rails. Interior glass stop shall be screw applied.
 9. Door Bottom: Concealed Adjustable Door Bottom with dual brushes.
 10. Meeting stiles of pairs: Manufacturers full height adjustable astragal.
 11. Corner Joinery: Supply corner joint consisting of two piece mortise and tenon type physically interlocked. Provide full-width 3/8 inch galvanized steel tie rods secured with locking hex nuts at each horizontal rail.
 12. Finish: Same as storefront.
- C. Preformed Aluminum Trim Covers: Provide preformed aluminum trim at new exterior frames where new frames meet existing construction to achieve a finished look. Dimensions to be verified in the field.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B 221 (ASTM B 221M); 6063 alloy, T5 temper typical. 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B 209 (ASTM B209M); 5005 alloy, H15 or H34 temper.
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel.
- E. Exposed Flashings: 0.062 inch thick aluminum sheet; finish to match framing members.
- F. Sealant for Setting Thresholds: Non-curing butyl type.
- G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- H. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.
- I. Self-sticking labels compliant with Industrial Code Rule No. 47: Transparent glass doors, fixed adjacent transparent glass sidelights and full height window systems shall be marked in two areas on the glass surface thereof. One such area shall be located at least 30, but not more than 36 inches and the other at least 60, but not more than 66 inches above the ground, The marking design shall be at least four inches in diameter if circular or four inches in its least dimension if elliptical or polygonal. or shall be at least 12 inches in horizontal dimension if the marking is less than four inches in its least dimension. In no event shall the vertical dimension of any marking including lettering be less than one and one-half inches in height.

2.5 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.6 HARDWARE

- A. Other Door Hardware: See Section 08 71 00.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Door Bottom: Manufacturer to supply and install concealed adjustable dual brush door bottom with up to 5/8 inch adjustment.
- D. Adjustable Astragal: Manufacture to supply and install adjustable full height astragal for pairs of doors.
- E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors. ADA compliant. Thermally broken.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.

- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- B. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.7 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.
- B. Factory glazing.
- C. Operating hardware.
- D. Insect screens.

1.2 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications: Steel lintels.
- B. Section 06 10 00 - Rough Carpentry: Rough opening framing.
- C. Section 07 25 00 - Weather Barriers: Sealing frame to water-resistive barrier installed on adjacent construction.
- D. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- C. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2012.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- J. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- K. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

- L. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).
- M. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- N. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2017.
- O. NFRC 100 - Procedures for Determining Fenestration Product U-Factors and Solar Heat Gain Coefficients at Normal Incidence.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
- C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.
- D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
 - 1. Evidence of AAMA Certification.
 - 2. Evidence of WDMA Certification.
 - 3. Evidence of CSA Certification.
 - 4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.
- E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.
- F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Submit NFRC 100- CMA Bid Report for the project showing compliance with the project thermal requirements at time of initial submission. Bid report shall be based on NFRC test sizes utilizing project specific glazing.

1.5 QUALITY ASSURANCE

- A. Aluminum Windows: Fabricate window assemblies in accordance with AAMA 101 for types of windows required.
- B. Insulated Glass: Fabricate insulated glass units in accordance with GANA (formerly FGMA) Glazing Manual.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of AAMA CW-10.

- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

- A. Section 01 60 00 - Product Requirements
- B. Do not install sealants when ambient temperature is less than 40 degrees F.
- C. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN - AW PERFORMANCE CLASS WINDOWS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 having Performance Class of AW, and Performance Grade at least as high as specified design pressure.
- B. Fixed, Thermally-Broken:
 - 1. Basis of Design: Boyd Aluminum; Series 3250XTF Fixed, 3-1/4-inch deep frame, thermally broken: www.boydaluminum.com/#sle.
- C. Projected, Face of Sash and Frame in Approximately Same Plane:
 - 1. Basis of Design: Boyd Aluminum Series 3250XTC, Casement Project Out, 3-1/4-inch deep frame, thermally broken: www.boydaluminum.com/#sle.
- D. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
 - 1. Manko Window Systems, Inc: www.mankowindows.com/#sle.
 - 2. EFCO, a Pella Company: www.efcocorp.com

2.2 ALUMINUM WINDOWS

- A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
 - 1. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
 - 2. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 - 3. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
 - 4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 - 5. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

6. Thermal Performance: Installed system shall conform to the following minimum standards:
 - a. Fabricator will be required to thermally model each head, sill and jamb, including adjacent construction, using thermal computer modeling software by an NFRC certified simulator to conform to the following:
 - b. Inside air temperature of 72 degrees F at 30 percent RH and an outside air temperature of -10 degrees F with a 15 mph wind speed.
 - c. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.
- B. Fixed, Non-Operable Type:
 1. Construction: Thermally broken.
 2. Exterior Finish: Class I color anodized.
 3. Interior Finish: Class I color anodized.
- C. Outswinging Casement Type:
 1. Construction: Thermally broken.
 2. Provide screens. Removable at emergency egress windows.
 3. Exterior Finish: Class I color anodized.
 4. Interior Finish: Class I color anodized.

2.3 PERFORMANCE REQUIREMENTS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 1. Performance Class (PC): AW.
 2. Performance Grade (PG): 40, with minimum design pressure (DP) of 40.10 psf.
- B. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.
- D. Air Leakage: 0.1 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.
- E. Condensation Resistance Factor of Frame: 58, measured in accordance with AAMA 1503.
- F. Overall Thermal Transmittance (U-value):.36, maximum, including glazing, measured on window sizes required for this project. Based on glass/ spacer per Section 08 80 00, and based on NFRC 100 sizes.
- G. Forced Entry Resistance: Tested to comply with ASTM F588 requirements for performance level of Grade 10 for specific window style required.
- H. Provide rescue window clearances per Building Code & NYSED MPS requirements at operable windows indicated.

2.4 COMPONENTS

- A. Frames: 2 inch wide by 3 1/4 inch deep profile, of .125 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.
- B. Subframe (Receptor System): .070 inch minimum thickness extruded aluminum, 6065 T6; one piece full width or height of opening.

- C. Sills: .125 inch thick, extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening; jamb angles to terminate sill end.
- D. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
 - 1. Hardware: Spring loaded steel pins; four per screen unit.
 - 2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
 - 3. Frame Finish: Same as frame and sash.
 - 4. Screens at rescue windows shall be hinged or sliding and shall be operable from the inside with one hand, and without the use of a key or other device.
- E. Operable Sash Weatherstripping: Resilient plastic; permanently resilient, profiled to achieve effective weather seal.
- F. Fasteners: Stainless steel.
- G. Glazing Materials: See Section 08 80 00.
- H. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.
- I. Rescue Window Labels: Provide self-sticking labels of size and color to meet applicable code requirements and to match existing labels.
 - 1. Labels are to be provided at all student occupied spaces.
 - 2. Labels are to have the following criteria:
 - a. Bright yellow background with black letters.
 - b. Size: 3 inches by 5 inches
 - c. Text: "Rescue Window" readable from each side of the window.
 - d. Any window covers must also have labels.

2.5 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.6 HARDWARE

- A. Casement:
 - 1. Four-bar 90 degrees friction hinges of stainless steel construction.
 - 2. Combination lever handle and cam latch.
 - 3. Push/Pull handle of White Bronze US-25-D construction.

2.7 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42, integrally colored anodic coating not less than 0.7 mil thick. Color as selected from manufacturer's full range.
- B. Operator and Exposed Hardware: Enameled to color as selected from manufacturer's standard line.
- C. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 25 00.

3.2 PRIME WINDOW INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Install sill and sill end angles.
- E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Install operating hardware not pre-installed by manufacturer.
- G. Install glass and infill panels in accordance with requirements; see Section 08 80 00.

3.3 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.
- B. Provide field testing of installed aluminum windows by independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.
 - 1. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 1.9 psf.
 - 2. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.
- C. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.6 CLEANING

- A. Remove protective material from factory finished aluminum surfaces.

- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

Door Hardware
Section 08 71 00

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.

- a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- C. Informational Submittals:
 1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
 2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.
- D. Closeout Submittals:
 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

- a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
- b. Catalog pages for each product.
- c. Final approved hardware schedule edited to reflect conditions as installed.
- d. Final keying schedule
- e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
- f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.

- b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
 2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
 3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
 4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.
- C. Pre-Installation Meetings
1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
 2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
 3. Electrified Hardware Coordination Conference:
 - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.

- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Schlage ND Series: 10 years
 - 2) Exit Devices
 - a) Von Duprin: 3 years
 - 3) Closers
 - a) LCN 4000 Series: 30 years
 - b. Electrical Warranty
 - 1) Locks
 - a) Schlage: 1 year
 - 2) Exit Devices

- a) Von Duprin: 1 year
- 3) Closers
 - a) LCN: 2 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fabrication
 - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
 - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- C. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

Door Hardware
Section 08 71 00

1. Scheduled Manufacturer:
 - a. Ives

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ND series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: SPA

2.09 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 98/35A series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.

6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.10 ELECTRONIC ACCESS CONTROL WIRELESS CYLINDRICAL LOCK

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Schlage NDEB series (provided by security integrator)

B. Requirements:

1. ANSI/BHMA A156.2 Series 4000, Grade 1.
2. Florida Building Code (ASTM E330, E1886, E1996) and Miami Dade (TAS 201, 202, 203) requirements for hurricanes.
3. Certified to UL10C 3-hour rating, ULC-S319, FCC Part15, ADA RoHS, ICC ANSI A117.1
4. Listed, UL 294 - The Standard of Safety for Access Control System Units.
5. Compliant with ANSI/BHMA A156.25 Operation and Security interior operating range of 32 degrees F (0 degrees C) to 120 degrees F(49 degrees C) for interior use only.
6. Compliant with ASTM E330 for door assemblies.
7. Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80 and IBC Chapter 10 Cylinders: Refer to "KEYING" article, herein.
8. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
 - a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access
 - b. Offset lever pull – minimum 1,600-foot pounds without gaining access
 - c. Vertical lever impact – minimum 100 impacts without gaining access
 - d. Cycle Test - tested to minimum 16 million cycles with no visible lever sag or use of performance aids such as set screws or spacers.
9. Emergency Override: Provide mechanical key override; cylinders: Refer to "KEYING" article, herein.
10. Levers:

- a. Vandal Resistance: Exterior (secure side) lever rotates freely while door remains locked, preventing damage to internal locking components from vandalism by excessive force.
 - b. Provide lever trim that operates independently of each other and is field reversible without tools.
 - c. Style: SPA
11. Power Supply: 4 AA batteries
- a. Provide battery powered wireless electronic products with the ability to communicate battery status and battery voltage level by means of a mobile app at door and remotely by Partner integrated software.
12. Features:
- a. Ability to communicate unit's communication status.
 - b. Visual LED indicators that indicate activation, operational systems status, system error conditions and low power conditions.
 - c. Audible feedback that can be enabled or disabled.
 - d. Suitable for both interior and exterior deployment.
 - e. Employ Wi-Fi communications to permit remote view of audits and alerts, as well as provide automatic daily updates to lock configuration and user access rights.
13. Adaptability:
- a. Open Architecture: Provide locksets manufactured with open architecture characteristics capable of handling new and existing access control software and credential reading technology. Can be supported by cloud-based web and mobile apps without the need for an integrated software partner.
14. Switches:
- a. Door Position Sensor – magnet integrated into strike to eliminate additional door prep
 - b. Interior Cover Tamper Guard
 - c. Battery Status
 - d. Request to Exit
 - e. Interior Push Button
15. Credentials: Provide integral credential reader modules in the following configurations:
- a. NFC, including peer-peer compatible, operable with both Android and IOS mobile devices
 - b. 125 kHz contactless smart cards
 - 1) Compatibility: Schlage, XceedID, ISONAS, HID, GE/CASI, AWID
 - c. 13.56 MHz contactless smart cards
 - 1) Secure section (multi-technology and smart card) compatibility: Schlage MIFARE Classic, Schlage MIFARE DESFire EV1/EV3
 - 2) 13.56 MHz Serial number only (multi-technology and smart card) compatibility: DESFire CSN, HID iCLASS CSN, MIFARE CSN, MIFARE DESFire EV1/EV3 CSN
 - d. Multi-technology contactless for applications requiring read capability for both 125 kHz proximity and 13.56 MHz contactless smart cards.
 - e. BLE
16. Records: Subject to the limitations of the attached access control system, the wireless locks possess enough storage capacity to support 5000 users and 2000 audits.
17. Verification time: less than or equal to 1 second for smart cards and proximity cards

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage/Von Duprin PS900 Series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
 - a. 12/24 VDC Output, field selectable.
 - b. Class 2 Rated power limited output.
 - c. Universal 120-240 VAC input.
 - d. Low voltage DC, regulated and filtered.
 - e. Polarized connector for distribution boards.
 - f. Fused primary input.
 - g. AC input and DC output monitoring circuit w/LED indicators.
 - h. Cover mounted AC Input indication.
 - i. Tested and certified to meet UL294.
 - j. NEMA 1 enclosure.
 - k. Hinged cover w/lock down screws.
 - l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 R

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Patented Restricted Small Format: cylinder with small format interchangeable cores (SFIC) with restricted, patented keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.13 KEYING

A. Scheduled System:

Door Hardware
Section 08 71 00

1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward biting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - 3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
 - 4) Key Blanks: Quantity as determined in the keying meeting.

2.14 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 ELECTRO-MECHANICAL CLOSER/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. LCN

B. Requirements:

1. Provide single-point or multi-point hold-open electro-mechanical closer/holders as specified. Coordinate voltage requirements and provide transformer if necessary.
2. Provide closer/holders that function as full rack and pinion door closer when current is interrupted or continuous hold-open is not engaged.
3. Provide door closers with fully hydraulic, full rack and pinion action with high strength cylinder and full complement bearings at shaft.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.

3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.21 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.22 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. LCN

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.23 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Schlage

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.24 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

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

2. Custom Steel Doors and Frames: HMMA 831.
 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
1. Install construction cores to secure building and areas during construction period.
 2. Replace construction cores with permanent cores as indicated in keying section.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
1. Conduit, junction boxes and wire pulls.
 2. Connections to and from power supplies to electrified hardware.
 3. Connections to fire/smoke alarm system and smoke evacuation system.
 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 5. Connections to panel interface modules, controllers, and gateways.
 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- M. Overhead Stops/ HOLDERS: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

- N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- O. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- P. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- Q. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- R. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- S. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Abbreviation	Name
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	LCN Commercial Division
MIS	Misc - Out-Sourced Items
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

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HARDWARE GROUP NO. 02

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR	626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.










HARDWARE GROUP NO. 03

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	ND40S SPA		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 04

Provide each PR door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
2	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR		626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CCV		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 05

Provide each SGL door(s) with the following:













QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR		626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 06

Provide each PR door(s) with the following:













QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON		689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB		689	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-98-EO		626	VON
1	EA	ELEC PANIC HARDWARE	RX-LC-QEL-98-NL-OP-110MD 24 VDC		626	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 12" O		630- 316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA SRT		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	SET	WEATHER STRIPPING	BY AL FRAME MANUFACTURER			MIS
1	EA	THRESHOLD	655A-223		A	ZER
2	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
2	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	CARD READER	BY SECURITY CONTRACTOR			MIS
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		LGR	SCE

OPERATIONAL DESCRIPTION:

1. DOORS NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS THE LATCH OF EXIT DEVICE TO RETRACT AND ALLOW ENTRY. DOOR MAY ALSO BE OPENED MANUALLY VIA USE OF KEY IN OUTSIDE CONTROL.
3. DOOR MAY ALSO BE USED AS PUSH/PULL PROVIDED THE DOORS ARE ELECTRICALLY DOGGED DOWN.
4. FREE EGRESS AT ALL TIMES VIA THE PANIC DEVICE.
5. PANIC DEVICE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
6. EXIT DEVICE IS FAIL-SECURE UPON LOSS OF POWER DOORS WILL REMAIN LOCKED.

HARDWARE GROUP NO. 07








Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	AUTO FLUSH BOLT	FB31P		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80HD SPA		626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	MOUNTING BRACKET	MB SERIES		689	IVE
2	EA	OH STOP	90S		630	GLY
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	MOUNTING PLATE	4040XP-18 SRT		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

A CONFLICT MAY OCCUR BETWEEN THE GJ O/H STOP AND THE CLOSER BODY, THE DROP PLATE MAY NEED TO BE DRILLED OUT TO ALLOW THE THRU-BOLTS OF THE O/H STOP TO BE INSTALLED.









HARDWARE GROUP NO. 08

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80HD SPA		626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 09

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR		626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	MAGNET	SEM7850 12V/24V/120V		689	LCN
1	EA	GASKETING	488SBK PSA		BK	ZER








TIE ELECTROMAGNETIC HOLDER INTO THE BUILDING FIRE ALARM SYSTEM UPON ACTIVATION OF FIRE ALARM SYSTEM DOOR WILL CLOSE.

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 10

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR		626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	FIRE/LIFE CLOSER	4040SE WMS AC/DC		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

TIE ELECTROMAGNETIC HOLDER INTO THE BUILDING FIRE ALARM SYSTEM UPON ACTIVATION OF FIRE ALARM SYSTEM DOOR WILL CLOSE.

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 11

Provide each RU door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	ALL HARDWARE	BY ROLL-UP DOOR MANUFACTURER			

HARDWARE GROUP NO. 12

Provide each SGL door(s) with the following:









QTY	EA	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR	626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 13

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR		626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	MOUNTING PLATE	4040XP-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER







OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

A CONFLICT MAY OCCUR BETWEEN THE GJ O/H STOP AND THE CLOSER BODY, THE DROP PLATE MAY NEED TO BE DRILLED OUT TO ALLOW THE THRU-BOLTS OF THE O/H STOP TO BE INSTALLED.











HARDWARE GROUP NO. 14

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-17		626	VON
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER







HARDWARE GROUP NO. 15

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		628	IVE
1	EA	CYL X TURN DEAD LOCK W/ OUTSIDE INDICATOR W/ INSIDE INDICATOR	L460HD 09-544 OS-OCC IS-LOC		626	SCH
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	PUSH PLATE	8200 4" X 16" CFT		630	IVE
1	EA	PULL PLATE	8302 6" 4" X 16" CFC		630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	WEATHER STRIPPING	BY AL FRAME MANUFACTURER			MIS
1	EA	THRESHOLD	566A-223		A	ZER

HARDWARE GROUP NO. 16

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
1	EA	WIRELESS ELECTRONIC LOCK	NDEBHD SPA BATTERY OPERATED PROVIDED BY SECURITY INTEGRATOR		626	SCE
1	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER




OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

A CONFLICT MAY OCCUR BETWEEN THE GJ O/H STOP AND THE CLOSER BODY, THE DROP PLATE MAY NEED TO BE DRILLED OUT TO ALLOW THE THRU-BOLTS OF THE O/H STOP TO BE INSTALLED.

HARDWARE GROUP NO. 17

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	DOOR CORD	798-18 LESS WIRES		626	SCE
2	EA	ELEC EXIT DEVICE TRIM	AD-300-993R-70-MT-SPA-R 12/24 VDC		626	SCE
2	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
1	EA	RE-USE	BALANCE OF EXISTING HARDWARE			








GC TO RE-WORK EXISTING DOORS & FRAME AS REQUIRED FOR NEW HARDWARE

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS TRIM OF EXIT DEVICE TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE PANIC DEVICE.
4. PANIC DEVICE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. TRIM IS FAIL-SAFE UPON LOSS OF POWER DOOR WILL UNLOCK.
6. TIE EXIT DEVICE INTO BUILDING FIRE-ALARM SYSTEM

HARDWARE GROUP NO. 18

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD		628	IVE
2	EA	PANIC HARDWARE	9827-EO-LBR		626	VON
2	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MT-SPA-B 4AA BATTERY		626	SCE
2	EA	SFIC EVEREST CORE	80-037 CKC EV29 R		626	SCH
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE
1	EA	RE-USE	EXISTING MAGNETIC DOOR HOLDERS			MIS

OPERATIONAL DESCRIPTION:

1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS TRIM OF EXIT DEVICE TO OPEN AND ALLOW ENTRY.
3. FREE EGRESS AT ALL TIMES VIA THE PANIC DEVICE.
4. PANIC DEVICE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. TRIM IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.
6. EXISTING ELECTRO-MAGNETIC WALL HOLDERS.

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Plastic films.
- D. Glazing compounds.

1.2 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers.
- B. Section 07 92 00 - Joint Sealant: Sealants for other than glazing purposes.
- C. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed door lites and borrowed lights in non-rated frames.
- D. Section 08 14 16 - Flush Wood Doors: Glazed lites in non-rated doors.
- E. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.
- F. Section 08 51 13 - Aluminum Windows: Glazing provided by window manufacturer.

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.
- 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 2015).
- E. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- J. ASTM F1233 - Standard Test Method for Security Glazing Materials And Systems; 2008 (Reapproved 2019).
- K. GANA (GM) - GANA Glazing Manual; 2008.

- L. GANA (SM) - GANA Sealant Manual; 2008.
- M. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- N. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- O. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.
- P. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).
- Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.
- R. UL 972 - Standard for Burglary Resisting Glazing Material; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 10 by 10 inch in size of glass units, showing coloration and design.
- E. Certificate: Certify that sealed insulated glazing units meet or exceed specified requirements.
 - 1. Submit NFRC 100- CMA Bid Report for the project showing compliance with the project thermal requirements at time of initial submission. Bid report shall be based on NFRC test sizes utilizing project specific glazing.
- F. Installer's Certificate: Certify that glass furnished without identification label is installed in accordance with Construction documents and applicable code.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.7 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.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
- C. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Guardian Industries Corp: www.sunguardglass.com.
 - 2. Pilkington North America Inc: www.pilkington.com/na.
 - 3. Solar Seal Company; www.solarseal.com.
 - 4. Vitro Architectural Glass: www.vitroglazings.com
- B. Laminated Glass Manufacturers:
 - 1. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com.
 - 2. Oldcastle Building Envelope: www.obe.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Security Glass Manufacturers:
 - 1. Armoured One; www.armouredone.com
 - 2. Global Security Glazing; www.security-glazing.com
 - 3. School Guard Glass; www.schoolguardglass.com
 - 4. Substitutions: Refer to Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: In accordance with ASCE 7.
 - a. Positive Design Pressure: 20 psf.
 - b. Negative Design Pressure: 20 psf.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
 - 4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 5. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.

1. In conjunction with weather barrier related materials described in other sections, as follows:
 - a. Water-Resistive Barriers: See Section 07 25 00.
 2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
 3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.3 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 3. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
 4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.
- B. Laminated Glass: Heat-Strengthened float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
- C. Laminated Glass which is also specified as Security Glass shall comply with UL 972 and ASTM F1233, Class 1.3.
1. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum, or as required to meet specified standards.

2.4 INSULATING GLASS UNITS

- A. Manufacturers:
1. Glass: Any of the manufacturers specified for float glass.
- B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Metal-Edge Spacers: Aluminum, bent and soldered corners.
 3. Spacer Color: Black.
 4. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
 - b. Color: Black.
 5. Purge interpane space with dry air, hermetically sealed.
- C. Type IG-A - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with argon.
 3. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.

4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Solarban 70 Low-E film, on #3 surface.
 5. Total Thickness: 1 inch.
 6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
 7. Visible Light Transmittance (VLT): 60 percent, nominal.
 8. Solar Heat Gain Coefficient (SHGC): 0.38 percent, nominal.
 9. Glazing Method: Dry glazing method, tape and gasket spline.
- D. Type IG-B - - Insulating Glass Units: Security glazing; ASTM F1233, Class 1.3; UL 972.
1. Applications:
 - a. Glazed lites in exterior doors and interior vestibule doors.
 - b. Glazed sidelights and panels next to exterior doors and interior vestibule doors.
 2. Space between lites filled with argon.
 3. Outboard Lite: Fully Tempered Safety Glass, 1/4 inch thick,, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.
 4. Laminated Inboard Lite: Glass Clad Polycarbonate
 - a. Glass: Inner and Outer panes shall be Fully tempered float glass.
 - b. Interlayer: Polyvinyl butyral (PVB); .030" minimum, or thickness as required
 - c. Overall Nominal Thickness: 3/8 inch thick, minimum.
 5. Total Thickness: 1 inch.
 6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.23, nominal.
 7. Visible Light Transmittance (VLT): 59 percent, nominal.
 8. Solar Heat Gain Coefficient (SHGC): 0.27 percent, nominal.
 9. Glazing Method: Dry glazing method, tape and gasket spline.
- E. Type IG-C - - Insulating Glass Units: One Way/Reflective and Security glazing; ASTM F1233, Class 1.3; UL 972.
1. Applications:
 - a. Glazed lites in exterior doors and interior vestibule doors.
 - b. Glazed sidelights and panels next to exterior doors and interior vestibule doors.
 2. Space between lites filled with argon.
 3. Outboard Lite: Fully Tempered Safety Glass, 1/4 inch thick,, minimum.
 - a. Tint: One Way Glazing/Reflective Glazing.
 - b. Coating: One Way / Reflective, on #1 surface.
 - c. Coating: Low-E (passive type), on #2 surface.
 4. Laminated Inboard Lite: Glass Clad Polycarbonate
 - a. Glass: Inner and Outer panes shall be Fully tempered float glass.
 - b. Interlayer: Polyvinyl butyral (PVB); .030" minimum, or thickness as required
 - c. Overall Nominal Thickness: 3/8 inch thick, minimum.
 5. Total Thickness: 1 inch.
 6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.23, nominal.
 7. Visible Light Transmittance (VLT): 59 percent, nominal.
 8. Solar Heat Gain Coefficient (SHGC): 0.27 percent, nominal.
 9. Glazing Method: Dry glazing method, tape and gasket spline.

2.5 GLAZING UNITS

- A. Type SG - Security Glazing: Laminated glass, 3-Ply.
1. Applications: Locations as indicated on drawings.
 2. Tint: Clear.
 3. Thickness: 3/8 inch.
 4. Outer Lite: Tempered glass.
 5. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
 6. Inside Lite: Tempered glass.

2.6 PLASTIC FILMS

- A. Type SF - Safety and Security Plastic Film: Bullet Resistant type.
 - 1. Application: Locations as indicated on drawings.
 - 2. Impact Resistance: Comply with ANSI Z97.1 and 16 CFR 1201 impact test requirements when applied to 1/8 inch thick annealed glass.
 - 3. Comply with FILTI Shooter Attack testing.
 - 4. Color: Clear.
 - 5. Thickness: 23 mil
 - 6. Adhered
 - 7. Manufacturer Basis of Design:
 - a. Armoured One; armouredone.com.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.7 GLASS COATINGS

- A. Type OC: Opacifying Coating: One component, water-based silicone elastomeric opaque color coating for roll coat and spray applications.
 - 1. Application: Exterior spandrel location as indicated on drawings.
 - a. Glass and Coating Orientation at Spandrels: On surface facing interior.
 - 2. Fabrication of Glass Unit with Coating: Solely by Approved Factory Fabricators trained and certified annually by coating manufacturer.
 - 3. Color: Selected from manufacturer's standard range and indicated on drawings.
 - 4. Products:
 - a. ICD High Performance Coatings; OPACI-COAT-300: www.icdcoatings.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.8 ACCESSORIES

- A. Setting Blocks: Neoprene, 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 x width of glazing rabbet space minus 1/16 inch x 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.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color to match frame.

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 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.

- C. 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. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- D. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- E. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 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.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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.

3.6 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.

3.7 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

SECTION 08 81 00
FIRE RATED GLASS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire rated and safety rated glass for installation in steel frames and vision panels for fire rated doors.
- B. Fire-rated/temperature-rise glass and framing system.

1.2 RELATED SECTIONS:

- A. Section 07 92 00 - Joint Sealant: Sealant and back-up materials.
- B. Section 08 14 16 - Flush Wood Doors: Glazed lites in fire rated doors.
- C. Section 08 71 00 – Door Hardware.
- D. Section 08 80 00 - Glazing.

1.3 REFERENCES

- A. ANSI Z97.1 - American National Standard for Safety Glazing Materials used in Buildings - Safety Glazing Specifications and Methods of Test.
- B. ASTM E119 - Standard Test Method for Fire Tests of Building Construction and Materials.
- C. GANA - FGMA Sealant Manual.
- D. GANA - Glazing Manual.
- E. GANA PCR for Flat Glass: UN CPC 3711 Product Category Rule for Environmental Product Declarations.
- F. NFPA 80 - Standard for Fire Doors, Fire Windows.
- G. NFPA 251 - Fire Test for Fire Endurance of Building Construction and Materials.
- H. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- I. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.
- J. UL 9 - Fire Tests of Window Assemblies
- K. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
- L. UL 10B – Fire Tests of Window Assemblies.
- M. UL 263 - Fire Resistance Ratings
- N. CPSC 16 CFR, Part 1201 - Consumer Product Safety Standard - Safety Standard for Architectural Glazing.

1.4 SUBMITTALS

- A. Section 01 30 00 - Administrative Requirements, for Submittal procedures.

- B. Shop Drawings: Show dimensioned plans, elevations and details for doors, frames, and hardware components as shown on drawings and schedules. Provide templates for the location of embeds and anchor locations required any adjoining work.
- C. Product Data: Submit latest edition of manufacturer's product data providing product descriptions, technical data and installation instructions.
- D. Samples:
 - 1. Provide 12-inch square samples for each type glass specified.
 - 2. Provide manufacturer's color charts showing full range of powder coating colors for framing.
- E. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- F. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.
- G. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.
- H. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum ten years of documented experience.
- B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- D. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.
- E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to ASTM E119 and NFPA 257.
 - 1. Window assemblies with ratings of less than 60 minutes may be tested in accordance with ASTM E2010-01, NFPA 257, UBC 7-4, UL 9, CAN4-S106 Standard Test Methods.
- F. Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
 - 1. Door assemblies shall be tested to the acceptance criteria of ASTM E2074-00, NFPA 252, UL 9, UL 10-C Standard Methods of Fire Tests of Door Assemblies.

2. Window assemblies shall be tested to the acceptance criteria of ASTM E2010-01, NFPA 257, UL 10-B, UL 10-C Standard methods for Fire Tests of Window Assemblies.
 3. Wall assemblies shall be tested to the acceptance criteria of ASTM E119, NFPA 251, UL 263 Standard Test Methods for Fire Tests of Building Construction and Materials.
 4. An approved independent testing laboratory equal to UL shall conduct fire test
- G. Listings and Labels -Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer's listing.
- H. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.
- I. Door assemblies shall be marked with the hourly rating followed by the letter "S". The letter "S" indicates air leakage resistance testing conformance to UBC 7-2 Parts I and II.
- J. Regulatory Requirements: Comply with provisions of the following:
1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," and ANSI A117.1 as follows:
 2. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 3. Door Closers: Comply with the following maximum opening-force requirements indicated:
 4. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

1.6 PRE-INSTALLATION MEETING

- A. Section 01 30 00 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week before starting Work of this section.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle under provisions specified by manufacturer. For details on storage and product handling, please contact Manufacturer and request information on storage and product handling.
- B. Deliver materials to specified destination in manufacturer or distributor's packaging undamaged, complete with installation instructions.
- C. Store off ground, under cover, protected from weather and construction activities.
- D. Do not expose fire rated glass to temperatures greater than 120 degrees or less than minimum 40 Degrees F during storage and transportation.
- E. Do not expose the non-PVB side of glass to UV light.
- F. Store sheets of glass vertically. DO NOT lean.

1.8 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Provide the Manufacturer's limited five year warranty from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 FIRE RATED GLASS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following manufacturers:
1. Vetrotech Saint Gobain North America Inc; www.vetrotech.com.
 2. Safti First; www.safti.com.
 3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Fire Rated Glazing - Type FRG
1. Basis of Design: Keralite Standard Laminated (L) as manufactured by Vetrotech Saint Gobain
 2. Fire and impact safety-rated laminated glazing material for use in fire rated door, window, transom and borrowed lite assemblies.
 3. Properties:
 - a. Thickness: 5/16 inch (8 mm).
 - b. Weight: 4.5 lbs./sq. ft.
 - c. Approximate Visible Transmission: 80 percent.
 - d. Fire-ratings, tested and listed by Underwriters Laboratories; tested in accordance with UL 9, UL 10c, NFPA 252, NFPA 257, ASTM E 2010, and ASTM 2074, as indicated on drawings:
 - 1) Fire Rating: 20 minutes (with hose stream test) for doors, windows, sidelites, transoms and borrowed lites.
 - 2) Fire Rating: 45 minutes (with hose stream test) for doors, windows, sidelites, transoms and borrowed lites.
 - 3) Fire Rating: 60 minutes (with hose stream test) for doors, windows, sidelites and transoms.
 - 4) Fire Rating: 90 minutes (with hose stream test) for doors, windows, sidelites and transoms
 - e. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 4. Labeling: Each piece of fire-rated glazing shall be permanently labeled with the Manufacturer's, Warnock Hersey, and/or, Underwriters Laboratories' Logos on sizes up to 3325 sq. inches. Label is also to include name of product, fire rating period, safety glazing standards, and date of manufacture.
 5. Framing System: Standard fire rated doors and frames as specified.

2.2 ACCESSORIES

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
- B. Glazing Compound: DAP 33 putty.
- C. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:
1. Dow Corning 795 - Dow Corning Corp.
 2. Silglaze-II 2800 - General Electric Co.
 3. Spectrem 2 - Tremco Inc.

- D. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
- E. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.3 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirement.
- B. Fabrication Dimensions: Fabricate fire rated assembly to approved dimensions. Guarantee dimensions where practicable within required tolerance.
- C. Framing System: Furnish frame assemblies pre-welded.
 - 1. Field splice frames too large for shop fabrication or shipping or to fit in available building openings.
 - 2. Fit with manufacturer approved fasteners.
 - 3. Knock-down door perimeter frames are not permitted.
- D. Fabrication Dimensions: Fabricate fire rated assembly to dimensions verified in field.
- E. Obtain approved Shop Drawings prior to fabrication.

2.4 FINISHES

- A. Comply with NAAMM's (National Association of Architectural Metal Manufacturers) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish frames after assembly.
- C. Protect finishes on exposed surfaces from damage by applying a removable, temporary protective cladding before shipping.
- D. Appearance of Finished Work: Variations in appearance of adjacent frame sections are acceptable. Noticeable variations in the same piece are not acceptable.
- E. Color-Coated Finish: Apply manufacturer's standard powder coating finish system complying with AAMA 2603 applied to factory-assembled frames before shipping, complying with manufacturer's written instructions for surface preparation including pretreatment, application, and minimum dry film thickness.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Examine glass framing, with glazier present, for compliance with the following.
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Observable edge damage or face imperfections.

- D. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- E. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealant in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
 - 1. Glazing Sealants: Comply with FGMA and ASTM C1193.
 - 2. Fire Rated Openings: Comply with NFPA 80.
- B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
- C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
- D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
- E. Place setting blocks located at quarter points of glass with edge block no more than 6 inches from corners.
- F. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
- G. Place glazing tape on free perimeter of glazing in same manner described above.
- H. Install removable stop and secure without displacement of tape.
- I. Install in vision panels in fire-rated doors to requirements of NFPA 80.
- J. Install so that appropriate UL markings remain permanently visible.

3.4 PROTECTION AND CLEANING

- A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels, and clean surfaces.
 - 1. Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.
 - 2. Bullet resistant glazing materials with sensitive protect surface applied film on exterior surface. Do not use any of the following:
 - a. Steam jets.
 - b. Abrasives.
 - c. Strong acidic or alkaline detergents, or surface-reactive agents.
 - d. Detergents not recommended by manufacturer.
 - e. Detergent above 77 degrees F (25 degrees C).
 - f. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
 - g. Metal or hard parts of cleaning equipment must not touch the glass surface.

- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.5 REPAIR AND TOUCH UP

- A. Limited to minor repair of small scratches. Use only manufacturer's recommended products.
 - 1. Such repairs shall match original finish for quality or material and view.
 - 2. Repairs and touch-up not visible from a distance of 5 feet (1.5 m). Owner and Architect to approve.
- B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged

END OF SECTION

SECTION 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
 - 1. Resilient tile and sheet.
 - 2. Carpet tile.
 - 3. Thin-set ceramic tile and stone tile.
- B. Removal of existing floor coverings.
- C. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
 - 1. Contractor shall include, in base bid, specified remediation work of all interior concrete floor slabs receiving floor coverings outlined below. If such remediation is indicated as not necessary following testing agency's report, a contract modification will be issued.
 - 2. Remedial Floor Coating to include in base bid at:
 - a. Existing concrete slabs receiving adhesively applied flooring.
 - b. Existing concrete slabs receiving Resinous Matrix Terrazzo.
 - c. New concrete slabs receiving Resinous Matrix Terrazzo.
 - d. Existing concrete slabs receiving Wood athletic flooring.
 - 3. Remedial Floor Coating not included in base bid at:
 - a. New concrete slabs receiving adhesively applied flooring where Moisture Vapor Reduction Admixture (MVRA) is integral in the new slab.
 - b. Existing concrete slabs receiving thin-set applied flooring, including but not limited to ceramic, quarry, and stone tile.
 - c. New concrete slabs receiving thin-set applied flooring, including but not limited to ceramic, quarry, and stone tile.
- F. Patching compound.
- G. Remedial floor coatings.

1.2 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.
- B. Section 01 74 19 - Construction Waste Management and Disposal: Handling of existing floor coverings removed.
- C. Section 03 30 00 - Cast-in-Place Concrete: Concrete admixture for slabs to receive adhered flooring, to prevent moisture content-related flooring failures.
- D. Section 03 30 00 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.
- E. Section 03 54 00 - Cast Underlayment: Self-leveling underlayment applied as remediation treatment.

1.3 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- D. ASTM F3010 - Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings; 2018.
- E. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2019.
- F. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.
- G. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2018.
- H. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Visual Observation Report: For existing floor coverings to be removed.
- C. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and alkalinity (pH) limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- D. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 - 1. Manufacturer's qualification statement.
 - 2. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
 - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
 - 4. Manufacturer's installation instructions.
 - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- E. Testing Agency's Report:
 - 1. Description of areas tested; include marked up floor finish plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and alkalinity (pH) test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.
 - 6. Product data for recommended remedial coating.
 - 7. Submit report to Architect.

8. Submit report not more than two business days after conclusion of testing.

F. Adhesive Bond and Compatibility Test Report.

G. Copy of RFCI (RWP).

1.6 PERFORMANCE REQUIREMENTS

A. Manufacturer must provide Independent lab test reports documenting performance per the following:

1. ASTM E 96, Water Vapor Transmission (wet method) Performance shall be documented by an independent testing laboratory at a minimum of 97% water vapor transmission reduction compared to untreated concrete.
2. ASTM E96- Perm Rating - Standard Test Method for Water Vapor Transmission of Materials – Perm Rate results must not exceed 0.1 Perms.
3. ASTM D 1308; Insensitivity to alkaline environment up to, and including, pH 14. A 14 day test is required with no degradation of sample reported.
4. Certify acceptance and exposure to continuous topical water exposure after final cure.

1.7 QUALITY ASSURANCE

A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.

B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.

1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.

C. Contractor's Responsibility Relating to Independent Agency Testing:

1. Provide access for and cooperate with testing agency.
2. Confirm date of start of testing at least 10 days prior to actual start.
3. Allow at least 4 business days on site for testing agency activities.
4. Achieve and maintain specified ambient conditions.
5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

D. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.

B. Deliver materials in manufacturer's packaging; include installation instructions.

C. Keep materials from freezing.

1.9 FIELD CONDITIONS

A. Only conduct calcium chloride tests at the same temperature and humidity expected during normal use, maintained 48 hours prior to and during testing. If this is not possible, use the following guidelines:

B. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.

- C. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
 - 3. Products:
 - a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.
 - b. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat: www.tecspecialty.com/#sle.
 - c. CMP Specialty Products; Prepstar: www.cmpsp.com.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single-layer epoxy based coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
 - 1. System shall comply with requirements of ASTM F3010.
 - 2. Thickness: As required for application and in accordance with manufacturer's installation instructions.
 - 3. Water Vapor reduction system shall be a single coat, stand alone system with no requirements for additional components such as sand broadcast for adhesion of flooring systems.
 - 4. System must reduce Calcium Chloride readings of up to 25lbs/1000 ft²/24 hrs by 97% in one coat. System must be able to perform as required with RH Probe readings of 100%.
 - 5. Products:
 - a. ARDEX Engineered Cements; ARDEX MC RAPID: www.ardexamericas.com/#sle.
 - b. CMP Specialty Products; Lockdown: www.cmpsp.com.
 - c. Koster American Corporation; VAP I 2000: www.kosterusa.com/#sle.
 - d. Or as approved by manufacturer of flooring system.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:

1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
2. Preliminary cleaning.
3. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
6. Specified remediation, if required.
7. Patching, smoothing, and leveling, as required.
8. Other preparation specified.
9. Adhesive bond and compatibility test.
10. Protection.

B. Remediations:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: Apply remedial floor coating over entire suspect floor area.
3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.2 REMOVAL OF EXISTING FLOOR COVERINGS

- A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.3 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.4 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.5 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

3.6 ALKALINITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
 - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
 - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.7 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Comply with recommendations for preparation and application in accordance with ASTM F3010.
- D. Clean all surfaces to receive moisture vapor reduction system. Shot blast all floors to a Concrete Surface Profile (CSP) #3 or #4 and clean surfaces with an industrial vacuum cleaner and remove all residues from the substrate. Grinding is allowed only in areas not accessible by shot blasting. Remove ALL defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents,

form release agents, efflorescence, laitance, Shot blast bee bees, etc. Repair all cracks, expansion joints, control joints, and open surface honeycombs and fill in accordance with Manufacturer's recommendations. If concrete additives such as chlorides or any other soluble compounds that may contaminate surfaces have been used in the concrete mix do not use this product on that floor without written approval from manufacturer. Reinforcing fibers that are visible after shot blasting must be removed and vacuumed leaving no fibers left on the concrete surfaces. Provide an uncontaminated, sound surface. DO NOT ACID ETCH!

- E. Repair concrete prior to moisture vapor reduction system installation by using MVRS manufacturer's approved concrete repair materials. Comply with all requirements as listed in Manufacturer's technical data information. Consult with vapor reduction manufacturer.
- F. Ensure surfaces to be treated with moisture vapor reduction system have NOT previously been treated with other materials such as underlayments, screeds, penetrating sealants, silicates, etc. If this is the case, consult with the Manufacturer's Representative prior to any application of moisture vapor reduction system.
- G. Any testing for concrete deficiencies or contamination such as alkali silica reaction, untreated silicates, organic residue, etc. is recommended and is the responsibility of the Building owner.
- H. Shot blast a small test area and review surface profile with the finished flooring applicator.
- I. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- J. Do not fill expansion joints, isolation joints, or other moving joints.

3.8 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. The Owner's Special Inspector shall verify proper adhesion of flooring adhesives, coatings, and leveling compounds to the final vapor reduction coating system for acceptability. Contact Manufacturer's Representatives for recommendations.
- B. Comply with requirements and recommendations of floor covering manufacturer.

3.9 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.
- B. Allow to cure a minimum of 12 hours before installing flooring system.

3.10 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.
- B. Protect each coat during specified cure period from any kind of traffic, topical water and contaminants.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Gypsum sheathing.
- F. Cementitious backing board.
- G. Gypsum wallboard.
- H. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 21 00 - Thermal Insulation: Acoustic insulation.
- C. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.

1.3 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016.
- B. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members; 2015.
- C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.
- D. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- E. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2016).
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- H. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- I. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.
- J. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).

- K. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- L. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- M. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2018.
- N. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2019b.
- O. 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.
- P. 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; 2018.
- Q. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2019.
- R. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- S. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.
- T. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
- U. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.
- V. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2019.
- W. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- X. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019.
- Y. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- Z. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- AA. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- AB. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- AC. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
- AD. GA-224 - Installation of Predecorated Gypsum Board; Gypsum Association; 2008.
- AE. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2016.
- AF. GA-600 - Fire Resistance Design Manual; 2015.
- AG. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data:
 - 1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- C. Test Reports: For stud framing products that do not comply with AISI S220 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.5 QUALITY ASSURANCE

- A. Manufacturer: company specializing in manufacturing products specified in this section with minimum ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least ten years of documented experience.

1.6 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

PART 2 PRODUCTS

2.1 GYPSUM 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 Rated Assemblies: Provide completed assemblies (Tested rating determined in accordance with ASTM119) with rating as indicated on drawings.
 - 1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.2 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 2. Marino: www.marinoware.com/#sle.
 - 3. MBA Studs: www.mbastuds.com
- C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Studs: C-shaped with knurled or embossed faces.
 - 2. Minimum Base Metal Thickness: 18 mils; 0.018 inch, or as required to meet design or code requirements.
 - 3. Runners: U shaped, sized to match studs.
 - 4. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.

- D. Shaft Wall Studs and Accessories: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
1. Complete system incorporating products must be provided by the same manufacturer. Subject to performance criteria specified and as indicated on drawings:
 - a. Steel components: Minimum Base Metal Thickness: 33 mils; 0.033 inch
 - b. Steel C-H Studs, 212 CH20 or 400 CH20, hot dipped galvanized, lengths as required.
 - c. Steel E-Studs, 212 ES20 or 400 ES20, hot dipped galvanized, lengths as required.
 - d. Steel J-Runners, 212 JR20 or 400 JR20, hot dipped galvanized for use with shaft wall studs.
 - e. 1" and 5/8" Type X Gypsum Board.
 - f. Sound Attenuation Fire Blanket Insulation: Minimum 1 ½ inch for use with 2 ½ inch studs and minimum 3 inch for use with 4 inch studs.
 2. Products:
 - a. Same manufacturer as other framing materials.
- E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
 3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
 4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.
 - a. Products:
 - 1) ClarkDietrich; MaxTrak Slotted Deflection Track: www.clarkdietrich.com/#sle.
 - 2) Marino; Slotted Track: www.marinoware.com/#sle.
 - 3) MBA Building Supplies; Slotted Slip Track: www.mbastuds.com/#sle.
 - 4) Substitutions: See Section 01 60 00 - Product Requirements.
- F. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
1. Products:
 - a. ClarkDietrich; BlazeFrame Firestop Deflection Track: www.clarkdietrich.com/#sle.
- G. Non-structural Framing Accessories:
1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
 3. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
 4. Drywall Corner Clips: Drywall clips help support drywall to reduce wood blocking on top plates, end walls, and corners.
- H. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
1. Products:
 - a. CertainTeed Corporation: www.certainteed.com/ceilings-and-walls/#sle.
 - b. USG Corporation; Drywall Suspension System: www.usg.com/#sle.

2.3 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.
- A. Gypsum Wallboard - General
 - 1. All gypsum wallboard incorporated into the Work, whether indicated or not, shall comply with all of the following:
 - a. Thickness: 5/8 inch.
 - b. Core: Type X, UL or WH listed.
 - 1) Exception: Where Fire Resistance Rating requires Type C.
 - c. Core and Face: Moisture and mold resistant, with a mold resistance score of 10, when tested in accordance with ASTM D3273.
- 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. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold resistant board is required at all locations.
 - 4. 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.
 - 5. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
 - 6. 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 Fireguard X Mold-Guard: www.gpgypsum.com/#sle.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Gypsum Board: www.goldbondbuilding.com/#sle.
 - d. USG Corporation; Sheetrock Brand EcoSmart Panels Mold Tough Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
 - 7. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme Fire-Shield Gypsum Panel: www.goldbondbuilding.com/#sle.
 - c. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough Regular 1/2 in. (12.7 mm): www.usg.com/#sle.
- C. Backing Board For Wet Areas: One of the following products:
 - 1. Application: Surfaces behind tile in wet areas including tub and shower surrounds and shower ceilings.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. 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: 5/8 inch.
 - b. Products:

- 1) PermaBASE Building Products, LLC provided by National Gypsum Company; PermaBase Cement Board: www.goldbondbuilding.com/#sle.
- 2) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
 - b. Products:
 - 1) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
- D. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
 1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Glass Mat Faced Products:
 - a. CertainTeed Corporation; GlasRoc Shaftliner Type X: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant): www.gpgypsum.com/#sle.
 - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Shaftliner: www.goldbondbuilding.com/#sle.
 - d. USG Corporation; Sheetrock Brand Glass-Mat Liner Panels Mold Tough 1 in. (25.4 mm): www.usg.com/#sle.

2.4 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: To match wall depth.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, or rolled zinc, 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.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 3. Joint Compound: Drying type, vinyl-based, ready-mixed.
 4. Joint Compound: Setting type, field-mixed.
- E. 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.

- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- H. 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

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that project conditions are ready to receive work and opening dimensions are as indicated on shop drawings to commence.

3.2 EXISTING WORK

- A. Extend existing gypsum board installations using materials and methods as specified.
- B. Repair and remodel existing gypsum board assemblies which remain or are to be altered.

3.3 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
 - 1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
 - 2. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.

3.4 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with AISI S220 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Install in accordance with ASTM C754.
 - 2. Coordinate location of hangers with other work.
 - 3. Install ceiling framing independent of walls, columns, and above ceiling work.
 - 4. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
 - 5. Laterally brace entire suspension system.
- C. Studs: Space studs at 16 inches on center.
 - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging. Provide extended leg ceiling runners with compressible fire rated fill.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

- E. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
- F. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
- G. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.
- H. Blocking: Install wood blocking for support of:
 - 1. Wall-mounted cabinets.
 - 2. Plumbing fixtures.
 - 3. Toilet partitions.
 - 4. Toilet accessories.
 - 5. Wall-mounted door hardware.
 - 6. Wood frame opening.
 - 7. Or any other materials requiring blocking. Coordinate blocking requirements with other contractors.

3.5 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place two beads continuously on substrate before installation of perimeter framing members.
 - 2. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, rough-in boxes, and other equipment. Do Not seal penetrations scheduled to receive firestopping.

3.6 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
 - 1. Use screws when fastening gypsum board to metal furring or framing.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Double-Layer Non-Rated:
 - 1. Use gypsum backing board for first layer, placed perpendicular to framing or furring members, with ends and edges occurring over firm bearing. [Use fire rated gypsum backing board for fire rated partitions and ceilings.]
 - 2. Place second layer parallel to framing or furring members.
 - 3. Offset joints of second layer from joints of first layer.
 - 4. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
 - 1. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

1. Seal joints, cut edges, and holes with water-resistant sealant.
- G. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
- H. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.7 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 apart for exposed interior linear construction.
 2. Not more than 25 feet where ceramic wall tile is installed on an interior wall.
 3. Not more than 12 feet where ceramic wall tile is installed on an exterior wall, in direct sunlight or wet conditions.
 4. At metal door frames and windows above each jamb.
 5. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.8 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. 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.
 6. Level 0: Temporary partitions.
- 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.
- 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.

3.9 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.10 PROTECTION

- A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09 24 00
CEMENT PLASTERING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cement plastering.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 13 - Exterior Painting.

1.3 REFERENCE STANDARDS

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.
- B. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process; 2019.
- C. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- D. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- E. ASTM C206 - Standard Specification for Finishing Hydrated Lime; 2014.
- F. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters; 2015.
- G. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2019a, with Editorial Revision.
- H. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering; 2006 (Reapproved 2019).
- I. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2019.
- J. ASTM C933 - Standard Specification for Welded Wire Lath; 2018.
- K. NTMA (SPECS) - NTMA Terrazzo Specifications; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide data on plaster materials and trim accessories.
- C. Samples:
 - 1. Submit two samples, 6 by 6 inch in size illustrating finish color and texture.
 - 2. Submit two samples of each type trim accessory.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 MOCK-UPS

- A. Mock-Up Panel: Construct a 4 foot wide by 8 foot high sample panel of plaster work at the jobsite demonstrating installation procedures, finish texture, and color. Show each phase of installation including framing and reinforcement.

1.7 FIELD CONDITIONS

- A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

PART 2 PRODUCTS

2.1 CEMENT PLASTER APPLICATIONS

- A. Lath Plaster Base: Metal lath.
 - 1. Plaster Type: Factory prepared plaster mix.
 - 2. Number of Coats: Three.
 - 3. First Coat: Apply to a nominal thickness of 3/8 inch.
 - 4. Second Coat: Apply to a nominal thickness of 3/8 inch.
 - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
 - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.

2.2 FACTORY PREPARED CEMENT PLASTER

- A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
 - 1. Provide continuous exterior insulation as part of the system, by the same manufacturer.
 - 2. Provide weather resistive barrier as part of the system, by the same manufacturer.
 - 3. Manufacturers:
 - a. Dryvit Systems, Inc; Dryvit Commercial Cement Plaster 1: www.dryvit.com/systems/stucco/#sle.
 - b. LaHabra; FastWall 300: www.lahabrastucco.com/#sle.
 - c. Master Builders Solutions; Senergy Platinum CI Stucco Ultra: www.master-builders-solutions.com/en-us/#sle.

2.3 JOBSITE MIXED CEMENT PLASTER

- A. Materials:
 - 1. Portland Cement: ASTM C150/C150M, Type I.
 - 2. Masonry Cement: ASTM C91/C91M, Type N.
 - 3. Lime: ASTM C206, Type S.
 - 4. Sand: Clean, well graded, and complying with ASTM C897.
 - 5. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.
 - 6. Plaster Mix Reinforcement: Glass fibers, chopped to 1/2 inch nominal length, and alkali resistant.
 - 7. Exposed Aggregate: As selected by Architect..
 - a. Color: As selected by Architect.
 - b. Chip Size: As selected by Architect, and complying with grading standards included in NTMA (SPECS).
- B. Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.

2.4 ACCESSORIES

- A. Lath:
 - 1. Wire Size: 17 gauge, 0.453 inch.
 - 2. Galvanized: ASTM A641/A641M.
 - 3. Opening Size: 11/16 by 1-1/2 inches.
 - 4. Comply with ASTM C933.
 - 5. Products:
 - a. Structa Wire; Megalath: www.structawire.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Finishing Accessories: ASTM C1063; extruded aluminum alloy (6063 T5), galvanized steel sheet ASTM A924/A924M G90, rolled zinc, or rigid plastic, 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 plaster edges.
- C. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces, complying with ASTM C932.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.
- C. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

3.2 PREPARATION

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- C. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.
- D. Apply dash bond coat of plaster to solid bases and moist cure for at least 24 hours before applying first coat of jobsite mixed plaster.

3.3 INSTALLATION - WATER-RESISTIVE BARRIER

- A. Where cement plaster is installed as part of a barrier wall system, install two layers of water-resistive barrier in accordance with water-resistive barrier manufacturer's instructions.
- B. Integrate water-resistive barrier with flashing accessories, and adjacent doors, windows, penetrations, and cladding transitions.
- C. Apply water-resistive barrier horizontally with upper layer lapped over lower layer at least 2 inches.
- D. Lap water-resistive barrier at least 6 inches at vertical joints.

- E. Lap water-resistive barrier at least 16 inches beyond vertical line of inside and outside corners in both directions.

3.4 MIXING

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.5 APPLICATION

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
 - 1. Apply base coat(s) to fully embed lath and to specified thickness.
 - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C. Leveling Coat:
 - 1. Apply leveling coat to specified thickness.
- D. Finish Coats:
 - 1. Cement Plaster:
 - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
 - b. Apply desired surface texture while mix is still workable.
 - c. Aggregate Surfacing: Hand apply to provide full surface coverage.

3.6 TOLERANCES

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.7 REPAIR

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Cementitious backer board as tile substrate.
- D. Ceramic trim.
- E. Non-ceramic trim.

1.2 RELATED REQUIREMENTS

- A. Section 03 54 00 - Cast Underlayment.
- B. Section 07 13 00 - Sheet Waterproofing.
- C. Section 07 92 00 - Joint Sealant: Sealing joints between tile work and adjacent construction and fixtures.
- D. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- E. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

1.3 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
 - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017.
 - 2. 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.
 - 3. ANSI A108.1c - Specifications for Contractors 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 Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2016).
 - 4. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship; 2019.
 - 5. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
 - 6. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
 - 7. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
 - 8. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).

9. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
 10. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2017.
 11. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
 12. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2016).
 13. 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; 2017.
 14. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Vertical and Overhead Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Improved Modified Dry-Set Cement Mortar; 2020.
 15. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).
 16. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
 17. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Reaffirmed 2016).
 18. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation; 2014.
 19. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014.
 20. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.
- B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2012.
 - C. 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.
 - D. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane; 2017.
 - E. ASTM D4551 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane; 2017.
 - F. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2022.
- 1.4 ADMINISTRATIVE REQUIREMENTS
- A. See Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
 - B. Pre-installation Meeting: Convene a pre-installation meeting one week before starting work of this section; require attendance by all affected installers.
- 1.5 SUBMITTALS
- A. See Section 01 30 00 - 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: Submit two sets of samples of the following for color selection or verification of color and finish variations:
 - 1. Tile products.
 - 2. Threshold, trims, and accessories.
 - 3. Grouts.
 - 4. Sealants.
- 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.
- 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 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Tile: 5 percent of each size, color, and surface finish combination, but not less than 2 of each type.

1.6 CLOSEOUT SUBMITTALS

- A. See Section 01 70 00 - Execution and Closeout Requirements for closeout procedures.

1.7 QUALITY ASSURANCE

- A. Maintain one copy of ANSI A108/A118/A136 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum ten 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).
 - 2. Installer Certification:
 - a. Ceramic Tile Education Foundation (CTEF): Certified Tile Installer (CTI).
 - b. Apprenticeship Program: Installer has achieved Journeyworker status through an apprenticeship from the International Union of Bricklayers and Allied Craftworkers (IUBAC) or a U.S. Department of Labor (DOL)-recognized program.
 - c. Advanced Certifications for Tile Installers (ACT): Certification in the installation of membranes, mortar bed (mud) floors, mortar (mud) walls, shower receptors, large format tile, gauged porcelain tile/panels/slabs, and grouts.
 - d. International Masonry Training and Education Foundation (IMTEF): Supervisor Certification Program (SCP).
- D. Warranty: Installer of work contained in this Section to warrant installation for minimum of 1 year from date of completion for defects in workmanship.

1.8 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.
- B. Construct tile mock-up where directed by Architect, incorporating all components specified for the location.
 - 1. Minimum size of mock-up shall be determined by Architect.
 - 2. Approved mock-up may remain as part of work.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 60 00 - Product Requirements for product storage and handling requirements.
- B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.10 FIELD CONDITIONS

- A. Do not install adhesives and grouts 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. Manufacturers:
 - 1. American Olean Corporation: www.americanolean.com/#sle.
 - 2. Crossville, Inc.: www.crosvilleinc.com
 - 3. Dal-Tile Corporation: www.daltile.com/#sle.
- B. Colorbody Porcelain Mosaic Tile, Type FT-2, 3, 4: ANSI A137.1, standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 1 x 1 inch, nominal.
 - 3. Shape: Square.
 - 4. Edges: Cushioned.
 - 5. Surface Finish: Slip resistant.
 - 6. Color(s): As indicated on drawings.
 - 7. Products:
 - a. Dal-Tile Corporation; Keystones: www.daltile.com/#sle.
- C. Glazed Wall Tile, Type WT-1,2,3: ANSI A137.1, standard grade.
 - 1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
 - 2. Size: 3 by 12 inch, nominal.
 - 3. Edges: Cushioned.
 - 4. Surface Finish: Gloss.
 - 5. Color(s): As indicated on drawings.
 - 6. Pattern: As indicated on drawings.
 - 7. Products:
 - a. Dal-Tile Corporation; Color Wheel Collection - Classic: www.daltile.com/#sle.
 - b. Dal-Tile Corporation; Color Wheel Collection - Linear: www.daltile.com.
- D. Glazed Wall Tile, Type WT-4,5,6: ANSI A137.1, standard grade.
 - 1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
 - 2. Size: 6 by 18 inch, nominal.
 - 3. Edges: Cushioned.

4. Surface Finish: Gloss.
 5. Color(s): As indicated on drawings.
 6. Pattern: As indicated on drawings.
 7. Products:
 - a. Dal-Tile Corporation; Color Wheel Collection - Classic: www.daltile.com/#sle.
 - b. Dal-Tile Corporation; Color Wheel Collection - Linear: www.daltile.com.
- E. Porcelain Tile, Type FT-1: ANSI A137.1, standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: __8__by__8__ inch, nominal.
 3. Thickness: 0.41 inch.
 4. Edges: Square.
 5. Surface Finish: UPS.
 6. Slip Resistance: Meets ANSI A326.3
 7. Color(s): As indicated on drawings.
 8. Trim Units: Matching Cove shapes in sizes indicated.
 9. Products:
 - a. Crossville Inc.; Cross Colors Mingles Collection: www.crossvilleinc.com..

2.2 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching cove base ceramic shapes in sizes coordinated with field tile.
1. Applications:
 - a. Floor to Wall Joints: Cove base.
 2. Manufacturers: Same as for tile.
- B. Non-Ceramic Trim: Satin natural anodized extruded aluminum, Brushed Stainless Steel, style and dimensions to suit application, for setting using tile mortar or adhesive. Provide all internal connectors, internal and external corners, and end caps as required to complete installation.
1. Applications:
 - 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.
 2. Manufacturers:
 - a. LATICRETE International, Inc; ____: www.laticrete.com/#sle.
 - b. Schluter-Systems: www.schluter.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 2. Bostik Inc: www.bostik-us.com/#sle.
 3. Custom Building Products: www.custombuildingproducts.com/#sle.
 4. LATICRETE International, Inc: www.laticrete.com/#sle.
- C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
1. Applications: Use this type of bond coat where Large and Heavy Tile (LHT) mortar is indicated.
 2. Products:
 - a. LATICRETE International, Inc; 253 Gold: www.laticrete.com/#sle.

- b. LATICRETE International, Inc; Tri-lite: www.laticrete.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
- 1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
 - 2. Products:
 - a. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
- 1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Custom Building Products: www.custombuildingproducts.com/#sle.
 - 4. LATICRETE International, Inc: www.laticrete.com/#sle.
 - 5. Substitutions: See Section 01 60 00 - 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. Products:
 - a. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
- 1. Applications: Where indicated.
 - 2. Color(s): As scheduled. Refer to Finish Key
 - 3. Products:
 - a. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Premixed Polymer Modified Grout: Single component, stain resistant grout.
- 1. Applications: Where indicated.
 - 2. Color(s): As indicated on drawings.
 - 3. Products:
 - a. LATICRETE International, Inc; SPECTRALOCK 1 Pre-Mixed Grout: www.laticrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - 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 scheduled Refer to Finish Key.
 - 3. Products:
 - a. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Epoxy Grout Haze Remover: Water based gel for vertical and horizontal surfaces.

1. Products:
 - a. STONETECH, a division of LATICRETE international, Inc; STONETECH Epoxy Grout Haze and Coating Stripper: www.laticrete.com.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 ACCESSORY MATERIALS

- A. Waterproofing and Slab Crack Isolation Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 1. Crack Resistance: No failure at 1/8 inch gap, minimum; comply with ANSI A118.12.
 2. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber.
 - b. Thickness: 25 mils, minimum, dry film thickness.
 - c. Products:
 - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
 - 2) Substitutions: See Section 01 60 00 - Product Requirements.
- B. Backer Board: Cementitious type; See Section 09 21 16 - Gypsum Board Assemblies.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- 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 sub-floor surfaces, in areas with floor drains, are pitched uniformly to drains at 1/4 inch per foot nominal if not indicated on the drawings.
 1. Exception: Where tile is installed in areas of previously removed floor covering, and the sub-floor does not meet the stated pitch, build up thinset during installation to provide a positive pitch to drains of 1/8" per foot, minimum in all directions.

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. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.
- E. Scarify existing glazed structural block prior to installation of wall tile.
- F. Place thresholds and edge strips at exposed tile edges.

3.3 INSTALLATION - GENERAL

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.20, manufacturer's instructions, and TCNA (HB) recommendations.

- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2" width is used.
- 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.
 - 1. Tile joint width shall be as recommended by manufacturer for the individual tile type indicated, however, tile joint shall be no less than 1/8 inch, unless otherwise noted.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Maintain specified positive pitch to all floor drains in all directions.
- H. Install non-ceramic trim in accordance with manufacturer's instructions.
- I. Sound tile after setting. Replace hollow sounding units.
- J. Control and Expansion Joints:
 - 1. Keep control and expansion joints free of mortar, grout, and adhesive.
 - 2. Provide interior control joints in tiled surfaces at 20'-25' in each direction.
 - 3. Provide exterior control joints in tiled surfaces at 8'-12' in each direction.
 - 4. Provide interior control joints in tiled surfaces exposed to direct sunlight or moisture at 8' to 12' in each direction.
 - 5. Provide movement joints where tile work abuts restraining surfaces, including perimeter walls, dissimilar floors, curbs, columns, pipes, door and window frames and where changes occur in backing materials.
 - 6. Joints through tilework directly over structural joints must never be narrower than the structural joint.
 - 7. Apply sealant to joints.
- 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. When installation requires varying tile thickness due to patterning, build up thinset so that the entire installation is flush.
- O. Seal all sanded and unsanded grout, with the exception of epoxy grout, per grout manufacturer's installation instructions.

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. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.
 - 2. Where epoxy bond coat and grout are indicated, install in accordance with TCNA (HB) Method F131.

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.

3.6 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.
- B. Clean tile and grout surfaces per manufacturer's recommendations.

3.7 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit traffic over finished floor surface for 4 days after installation.
- C. Protect installed tile from damage due to subsequent construction until Date of Substantial Completion.

3.8 SCHEDULE

- A. Refer to Finish Key and Schedules.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Cloud Ceilings

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 07 21 00 - Thermal Insulation: Acoustical insulation.
- C. Section 09 51 53 - Direct-Applied Acoustical Ceilings.
- D. Section 09 54 23 - Linear Metal Ceilings.

1.3 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
- 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; 2013.
- D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- F. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2019.
- G. 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; 2017.
- H. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.
- I. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.
- J. UL (FRD) - Fire Resistance Directory; Current Edition.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 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.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, mechanical and electrical items installed in the ceiling, and indicate method of suspension where interference exists. Submit shop drawings for all custom shapes, clouds, and ceiling formations illustrating understanding of architect's intent. Notify architect in writing of any conflicts or dimensional changes.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Samples: Submit two samples 6 x 6 inch size illustrating material and finish of acoustical units.
- E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing the work specified in this section with minimum five years documented experience.
- C. Conform to CISCA requirements.
- D. Fire Rated Floor Construction: Rating as indicated on Drawings.
 - 1. Tested Rating: Determined in accordance with ASTM E119.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- F. Single Source Responsibility: To obtain combined warranty for the suspension system and the acoustical panel, color match or ceiling panel and suspension system compatibility, all acoustical panel and suspension system components shall be produced and supplied by one manufacturer. Materials supplied by more than one manufacturer are not acceptable.
- G. Requirements of regulatory agencies: Codes and regulations of authorities having jurisdiction.
- H. Source quality control:
 - 1. Test reports: Manufacturer will provide test certification for minimum requirements as tested in accordance with applicable industry standards and/or to meet performance standards specified by various agencies.

2. Changes from system: System performance following any substitution of materials or change in assembly design must be certified by the manufacturer.
3. All ceiling panel cartons must contain UL label for acoustical compliance.
4. All suspension system cartons must contain UL label for load compliance per ASTM C635.

I. Warranty

1. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - a. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 - b. Grid System: Rusting and manufacturer's defects
 - c. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
2. Warranty Period Armstrong Humiguard:
 - a. Acoustical panels: Ten (10) years from date of substantial completion.
 - b. Grid: Ten (10) years from date of substantial completion.
 - c. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.
3. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.7 DELIVERY AND STORAGE OF MATERIALS

- A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements.
- B. Storage:
 1. Panels: Storage time of materials at the job site should be as short as possible and environmental conditions should be as near as possible to those specified for occupancy. Excess humidity during storage can cause expansion of material and possible warp, sag, or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.
 2. Suspension System: Store in manner that will prevent warping, scratches and damage of any kind.
- C. Handling: Handle in such manner to ensure against racking, distortion, or physical damage of any kind.
- D. Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and panels, store them at a location where temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

1.8 FIELD CONDITIONS

- A. Maintain uniform temperature and humidity prior to, during, and after installation. Do not use ceiling panels in extreme or continuous high humidity, or areas exposed directly to weather or water. Ceiling panels are sized and designed for use within the standard occupancy range of temperature and humidity, 65-85 °F, no more than 70% RH (relative humidity). Humidity can

greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours.

- B. Allow time for dimensional changes in ceiling panels stored at temperature/humidity conditions well outside of those recommended for service. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium. With increases in temperature/humidity, these products expand (up to 1/64 in./ft. at 85 °F, 90% RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersize, but expand to normal when standard ambient conditions return.
- C. For some pattern edge details, if perimeter panels must be cut smaller, the cut edge must be field-rabbited, or the wall angle must be lowered by reveal depth.
- D. Indicate formaldehyde VOC Classification, as tested by ASTM D5116 and according to standards established by the Collaborative for High-Performance Schools (CHPS), the State of Washington, the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), and the American National Standards Institute (ANSI) & The California Office of Environmental Health Hazard Assessment (COEHHA).
 - 1. "Formaldehyde-free"
 - a. The California Office of Environmental Health Hazard Assessment recognizes products with emissions of less than 3 parts per billion (ppb) as "formaldehyde-free".
 - 2. "Low Formaldehyde"
 - a. The Collaborative for High Performance Schools standard for VOC emissions limits the amount to 13.5ppb = 0.0135 ppm = 16.5µg/m³ as a Low Formaldehyde VOC Class panels.

1.9 SEQUENCING

- A. Sequence Work to ensure acoustic 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. Install acoustic units after interior wet work is dry, including residual moisture from plaster, concrete, or terrazzo work.

1.10 EXTRA MATERIALS

- A. Acoustic Ceiling Units: Furnish quantity of five percent of total acoustic unit area installed of each tile to Owner.
- B. Exposed Suspension System Components: Furnish quantity of two percent of total amount installed to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. Armstrong World Industries, Inc: www.armstrong.com/#sle.
 - 2. USG: www.usg.com/#sle.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems:
 - 1. Same as for acoustical units. No exceptions.

2.2 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Tile Type ACT-1: Acoustically transparent membrane with factory-applied latex paint, ASTM E1264, Type XII Class A with the following characteristics:
 - 1. Size: 24 x 24 inches.
 - 2. Thickness: 1 3/4 inches.
 - 3. Light Reflectance: Not Less than .88 percent, determined in accordance with ASTM E1264.
 - 4. Noise Reduction Coefficient (NRC): Not less than .95 determined as specified in ASTM E1264.
 - 5. Ceiling Attenuation Class (CAC): Not less than 42, determined in accordance with ASTM E1264.
 - 6. Flame Spread: < 25
 - 7. Smoke Developed: < 50
 - 8. Bio Block Anti Mold and Mildew
 - 9. Edge: Square tegular.
 - 10. Warranty: 30 Year with suspension
 - 11. Surface Pattern: Smooth Textured.
 - 12. Products:
 - a. Basis of Design: Lyra PB High CAC; 8730PB.
- C. Acoustical Panels Type ACT-2 (009): Painted mineral fiber, ASTM E1264 Type IX, Class A with the following characteristics:
 - 1. Size: 24 by 24 inches.
 - 2. Thickness: 5/8" inches.
 - 3. Light Reflectance: Not less than 89 percent, determined in accordance with ASTM E1264.
 - 4. Ceiling Attenuation Class (CAC): Not Less than 33, determined in accordance with ASTM E1264.
 - 5. Edge: Square Lay-in
 - 6. Flame Spread: < 25
 - 7. Smoke Developed: < 50
 - 8. Bio Block Anti Mold and Mildew
 - 9. Recycled Content: 36% or greater
 - 10. Warranty: 30 year with Suspension
 - 11. Surface Pattern: Smooth Textured.
 - 12. Products:
 - a. Basis of Design: Kitchen Zone #673.
- D. Acoustical Panels Type ACT-3, 4: Acoustically transparent membrane with factory-applied latex paint, ASTM E1264 Type XII, Class A with the following characteristics:
 - 1. Panel Size: 48 by 48 inches
 - 2. Main Beam Spacing: 4 ft on center.
 - 3. Panel Shape(s): Triangle
 - 4. Thickness: 1 inches.
 - 5. Composition: Fiberglass with DuraBrite Acoustically Transparent Membrane.
 - 6. Light Reflectance: Not Less than 88 percent, determined in accordance with ASTM E1264.
 - 7. NRC:.95 determined as specified in ASTM E1264.
 - 8. Edge: Square Tegular
 - 9. Surface Color: As indicated on drawings.
 - 10. Surface Pattern: Smooth Textured.
 - 11. Flame Spread: < 25
 - 12. Smoke Developed: < 50

13. Bio Block Anti Mold and Mildew
 14. Recycled Content: 50% or greater
 15. Warranty: 30 years with suspension
 16. Products:
 - a. Bases of Design: Lyra PB 60 Degree Shapes for DESIGNFLEX.
- E. Acoustical Panels Type ACT-5, 8: Acoustically transparent membrane with factory-applied latex paint, ASTM E1264 Type XII, Class A with the following characteristics:
1. Panel Size: __48__by__48__ inches
 2. Main Beam Spacing: 4 ft on center.
 3. Panel Shape(s): RH Parallelogram.
 4. Thickness: 1 inches.
 5. Composition: Fiberglass with DuraBrite Acoustically Transparent Membrane.
 6. Light Reflectance: Not Less than 88 percent, determined in accordance with ASTM E1264.
 7. NRC:.95 determined as specified in ASTM E1264.
 8. Edge: Square Tegular
 9. Surface Color: As indicated on drawings.
 10. Surface Pattern: SmoothTextured.
 11. Flame Spread: < 25
 12. Smoke Developed: < 50
 13. Bio Block Anti Mold and Mildew
 14. Recycled Content: 50% or greater
 15. Warranty: 30 years with suspension
 16. Products:
 - a. Bases of Design: Lyra PB 60 Degree Shapes for DESIGNFLEX.
- F. Acoustical Panels Type ACT-6, 7: Acoustically transparent membrane with factory-applied latex paint, ASTM E1264 Type XII, Class A with the following characteristics:
1. Panel Size: __48__by__48__ inches
 2. Main Beam Spacing: 4 ft on center.
 3. Panel Shape(s): LH Parallelogram.
 4. Thickness: 1 inches.
 5. Composition: Fiberglass with DuraBrite Acoustically Transparent Membrane.
 6. Light Reflectance: Not Less than 88 percent, determined in accordance with ASTM E1264.
 7. NRC:.95 determined as specified in ASTM E1264.
 8. Edge: Square Tegular
 9. Surface Color: As indicated on drawings.
 10. Surface Pattern: Smooth Textured.
 11. Flame Spread: < 25
 12. Smoke Developed: < 50
 13. Bio Block Anti Mold and Mildew
 14. Recycled Content: 50% or greater
 15. Warranty: 30 years with suspension
 16. Products:
 - a. Bases of Design: Lyra PB 60 Degree Shapes for DESIGNFLEX.
- G. Acoustical Panels Type ACP-1: Rigid fiberglass with acoustically transparent membrane, ASTM E 1264 Type XII, Class A with the following characteristics:
1. Size: 5'-9" x 3'-4" inches.
 2. Shape: 60 Degree Parallelogram
 3. Thickness: 7/8 inches.
 4. Acoustical Absorption: (ASTM C423), Minimum 1.18 Sabins/SF.
 5. Flame Spread: (ASTM E 84), Class A
 6. Acoustical Performance: 1.18 Sabins/SF.
 7. Surface finish: DuraBrite acoustically transparent membrane on front and edges

8. Recycled Content: Minimum 50%
 9. Anti-microbial protection: Resistant to growth of mold/mildew/bacteria
 10. Composition: Rigid fiberglass
 11. Edge: Square.
 12. Surface Color: As indicated on drawings.
 13. Surface Pattern: Smooth.
 14. Products:
 - a. Basis of Design: Armstrong Soundscapes Shapes #7101P01.
- H. Acoustical Panels Type ACP-2: Rigid fiberglass with acoustically transparent membrane, ASTM E 1264 Type III, Class A with the following characteristics:
1. Size: 3'-9" x 3'-3" inches.
 2. Shape: 60 Degree Triangle
 3. Thickness: 7/8 inches.
 4. Acoustical Absorption: (ASTM C423), Minimum 1.18 Sabins/SF.
 5. Flame Spread: (ASTM E 84), Class A
 6. Acoustical Performance: 1.18 Sabins/SF.
 7. Surface finish: DuraBrite acoustically transparent membrane on front and edges
 8. Recycled Content: Minimum 50%
 9. Anti-microbial protection: Resistant to growth of mold/mildew/bacteria
 10. Composition: Rigid fiberglass
 11. Edge: Square.
 12. Surface Color: As indicated on drawings.
 13. Surface Pattern: Smooth.
 14. Products:
 - a. Basis of Design: Armstrong Soundscapes Shapes #7101T01.
- I. Acoustical Panels Type ACP-3: Rigid fiberglass with acoustically transparent membrane, ASTM E 1264 Type III, Class A with the following characteristics:
1. Size: 7'-9 1/2" x 3'-4" inches.
 2. Shape: 60 Degree Trapezoid
 3. Thickness: 7/8 inches.
 4. Acoustical Absorption: (ASTM C423), Minimum 1.18 Sabins/SF.
 5. Flame Spread: (ASTM E 84), Class A
 6. Acoustical Performance: 1.18 Sabins/SF.
 7. Surface finish: DuraBrite acoustically transparent membrane on front and edges
 8. Recycled Content: Minimum 50%
 9. Anti-microbial protection: Resistant to growth of mold/mildew/bacteria
 10. Composition: Rigid fiberglass
 11. Edge: Square.
 12. Surface Color: As indicated on drawings.
 13. Surface Pattern: Smooth.
 14. Products:
 - a. Basis of Design: Armstrong Soundscapes Shapes #7101Z01.

2.3 SUSPENSION SYSTEMS

- 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.
- B. Exposed Steel Suspension System Type ACT-1,2: Formed steel, commercial quality cold rolled; heavy-duty None N/A.
 1. Classification: Heavy Duty
 2. Main Tee-7301
 3. 4' Tee-XL7341
 4. 2' Tee-XL8320

5. Molding: 7800
 6. Finish: White
 7. Products:
 - a. Basis of Design: Prelude XL by Armstrong.
- C. Suspension System Type 2 (ACT-3-8):
1. Profile: 9/16" wide face
 2. Classification: Intermediate Duty
 3. Main Tee-7500
 4. 4' TeeXM7548
 5. 4' 60 Degree Cross Tee-XM756048
 6. Molding-HD7800
 7. Finish: White
 8. Products:
 - a. Basis of Design: Suprafine XM for DesignFlex Shapes by Armstrong.

2.4 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
1. Size: As required for installation conditions.
 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
- D. Metal Edge Trim for Suspension Systems: Steel or extruded aluminum; provide attachment clips, splice plates, and preformed corner pieces for complete trim system.
1. Trim Height: 6 inch.
 2. Finish: Baked enamel.
 3. Color: White.
- E. Axiom Classic Extruded Aluminum Trim:
1. Material: Alloy 6063 aluminum.
 2. Hanging Clip, T-Bar Connector Clip and Splice Plate: Galvanized steel.
 3. Surface Finish: factory applied baked polyester paint finish.
 4. Cross Tee / Main Beam Interface: Flush fit
 5. End Detail: Splice with screws.
 6. Warranty: Ten year limited warranty.
 7. Color: Refer to Finish Key.
 8. Accessories: Aircraft cable, Welded-Up Corners, Painted Metal Fascia, Rivets and Silicone as required for installation of acoustical clouds and ceilings as detailed.
- F. Axiom Vector Straight Perimeter Trim:
1. Material: Alloy 6063 aluminum.
 2. Hanging Clip, T-Bar Connector Clip and Splice Plate: Galvanized steel.
 3. Surface Finish: factory applied baked polyester paint finish.
 4. Cross Tee / Main Beam Interface: Flush fit
 5. End Detail: Splice with screws.
 6. Warranty: Ten year limited warranty.
 7. Color: Refer to Finish Key.
 8. Accessories: Aircraft cable, Welded-Up Corners, Painted Metal Fascia, Rivets and Silicone as required for installation of acoustical clouds and ceilings as detailed.
- G. Axiom 1-1/2" Acoustical Double-sided Transition, AX15DSCSTR
1. Material: Alloy 6063 aluminum.
 2. Size: 1-1/2" Face Profile.
 3. Hanging Clip, T-Bar Connector Clip and Splice Plate: Galvanized steel.

4. Surface Finish: factory applied baked polyester paint finish.
 5. Cross Tee / Main Beam Interface: Flush fit
 6. End Detail: Splice with screws.
 7. Warranty: Ten year limited warranty.
 8. Color: Refer to Finish Key.
 9. Accessories: Aircraft cable, Welded-Up Corners, Painted Metal Fascia, Rivets and Silicone as required for installation of acoustical clouds and ceilings as detailed.
- H. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.2 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.
- C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

3.3 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636/C 636M 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. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Install in bed of acoustical sealant.
 2. Use longest practical lengths.
 3. Overlap and rivet corners.
- 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. Do not eccentrically load system or induce rotation of runners.
- I. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

- J. Where installing sheet metal trim between two overlapping ceiling planes, provide a StrongBack Support (SB-12) as an attachment point for the lower ceiling plane. Span entire length of connection.

3.4 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 and bullnose concrete block corners occur, provide preformed closures to match perimeter molding.

3.5 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.

3.6 SCHEDULE

- A. Refer to drawings for Finish Key and Schedule

END OF SECTION

SECTION 09 51 53
DIRECT-APPLIED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Acoustic units.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
- B. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2016.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. See Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Sequence work to ensure acoustic 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.
- C. Install acoustic units after interior wet work is dry.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on acoustic units.
- C. Shop Drawings: Indicate tile layout and related junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.
- D. Samples: Submit two samples, 6 by 6 inch in size, illustrating material and finish of acoustic units.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- F. Manufacturer's Qualification Statement.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of documented experience.

1.7 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.
- B. Construct tile mock-up of each product type, incorporating all components specified for the location including transitions and trims.
 - 1. Minimum size of mock-up is 6 x 6 foot.
 - 2. Approved mock-up may remain as part of the Work upon Architect approval.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Direct Applied Acoustical Ceilings:
 - 1. Armstrong World Industries, Inc: www.armstrong.com/#sle.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Acoustic Panel: (ACP-4) Mineral fiber, ASTM E1264 Type IV.
 - 1. Panel Size: 24 inches by 48 inches.
 - 2. Thickness: 3/4 inches.
 - 3. Noise Reduction Coefficient (NRC): 0.75 when tested in accordance with ASTM C423 for Type D-20 mounting, per ASTM E795.
 - 4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 50 or less, when tested in accordance with ASTM E84.
 - 5. Edge: Beveled.
 - 6. Surface Color: Refer to Finish Key.
 - 7. Surface Finish: Smooth-textured.
 - 8. Product:
 - a. Basis of Design: Armstrong Ceiling; Invisacoustics;
<https://www.armstrongceilings.com/>

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.

3.2 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Install acoustic units level in uniform plane.

3.3 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 54 23
LINEAR METAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Linear metal ceilings.
- B. Suspended metal support system and perimeter trim.

1.2 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- B. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this section with installation of mechanical and electrical components and with other construction activities affected by work of this section.
- B. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Furnish for component profiles, materials, perimeter and integral trim, and space closures.
- C. Shop Drawings: Indicate reflected ceiling plan.
- D. Samples: Submit two samples 4 by 4 inch in size illustrating color and finish of components exposed to view.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.
 - 2. Extra Linear Panels: One, standard length.

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 the work of this section.
 - 1. Minimum three years documented experience.

1.6 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Construct one mock-up, 4 feet long by 4 feet wide; include suspension system, panels, closures in mock-up.
- C. Locate mock-up where directed.
- D. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Accept factory-finished products on site in manufacturer's unopened factory packaging only; reject opened packages.
- C. Protect factory-finished products from damage to appearance by storing products in manufacturer's unopened factory packaging in dry storage area.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty; include coverage for corrosion resistance and discoloration of surface finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Linear Metal Ceilings:
 - 1. Armstrong World Industries, Inc; Metal Works: www.armstrongceilings.com/#sle.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 LINEAR METAL CEILINGS

- A. Linear Metal Ceiling System: Panels, suspension members, trim, and accessories as required to provide a complete system.
- B. Performance Requirements:
 - 1. Design to support imposed loads of indicated items without eccentric loading of supports.
 - 2. Design for maximum deflection of 1/360 of span.
 - 3. Surface Burning Characteristics: Flame spread index of 25, smoke developed index of 50, when tested in accordance with ASTM E84.

2.3 COMPONENTS

- A. Linear Metal Panels:
 - 1. Type: Linear panel, butt jointed; snap-in installation.
 - a. Size and Configuration: As indicated on drawings.
 - b. Panel Profile: Plank shaped with square edges.
 - c. Perforations: M1 and M2 perforations; refer to Finish Key..
 - 2. Material: Electrogalvanized steel sheet, ASTM A666, Type 304.

- a. Finish: Satin.
- b. Thickness: 0.028 inches.
- c. Color: Refer to finish key
- d. Perforations: M1 & M2 perforations as shown on drawings.
3. Size: Type ACT-9,10,16,18: 4 inch width by 96 inches long by 1 inch depth.
4. Size: Type ACT-11,12,15,19: 6 inch width by 96 inches long by 1 inch depth.
5. Size: Type ACT-13,14,17,20: 9 inch width by 96 inches long by 1 inch depth.
6. Product:
 - a. Basis of Design: Metalworks Synchro Linear Panels by Armstrong Ceilings.
- B. Acoustical Backer: Manufacturer's standard non-woven fabric; as required to achieve specified acoustic performance for M2 perforated panels.
- C. , Expansion Joints, and Splices: Same material, thickness, and finish as linear panels.
- D. Edge molding: Refer to 09 51 00 Acoustical Ceilings.
- E. Accessories: Stabilizer bars as required for suspended grid system; sight-exposed surfaces same color and finish as sight-exposed surfaces of linear panels.
- F. Suspension Members: Formed steel sections, with integral attachment points; galvanized finish; size and type to suit application and ceiling system flatness requirement specified.
 1. Main Beam: MetalWorks Linear - 12' Main Beam Carrier 2: 7277MF
 2. Cross Grid: MetalWorks Linear - 2' Drywall Grid Cross Tee: XL8926
 3. Perimeter Trim: Carrier Molding: 5574BL2
- G. Suspension Wire: Size and type as required for application, seismic requirements, and ceiling system flatness requirement specified.

2.4 FABRICATION

- A. Shop cut linear panels to accommodate mechanical and electrical items.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Verify that required utilities are available, in proper location, and ready for use.

3.2 INSTALLATION

- A. Suspension Components:
 1. Install after above-ceiling work is complete in accordance with manufacturer's instructions and ASTM C 636/C 636M.
 2. Hang carrying members independent of walls, columns, ducts, light fixtures, pipe, and conduit; where carrying members are spliced, avoid visible displacement of face panels with adjacent panels.
 3. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest adjacent hangers to span the required distance.
 4. Locate suspension system for linear panel layout on room axis according to reflected plan.
- B. Linear Metal Ceiling:

1. Install linear panels and other system components in accordance with manufacturer's instructions.
2. Stagger end joints minimum 12 inches.
3. Butt interior end joints tight.
4. Set exterior end joints with 1/16 inch gap for expansion and contraction.
5. Provide expansion joints to accommodate plus or minus 1 inch movement and maintain visual closure.
6. Field miter corners at changes in panel direction.
7. Install edge moldings at junctions with other finishes and at vertical surfaces; use maximum piece lengths.
8. Exercise care when site cutting sight-exposed finished components to ensure surface finish is not defaced.

3.3 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.

3.4 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Clean surfaces.
- C. Replace damaged or abraded components.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile/plank flooring.
- B. Resilient base.
- C. Resilient stair accessories.
- D. Installation accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- D. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.3 REFERENCE STANDARDS

- A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2015).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017a.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2019.
- D. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2017.
- E. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2015.
- F. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2018a.
- G. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.
- H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2019.
- I. UL 2824 - GREENGUARD Certification Program Method for Measuring Microbial Resistance From Various Sources Using Static Environmental Chambers; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. See Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Pre-installation Meeting: Convene a pre-installation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - 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: Field verify actual measurements before fabrication; indicate recorded measurements on shop drawings. Indicate floor patterns, colors and seaming plan.
- D. Verification Samples: Submit two samples, 12" x 12" illustrating color and pattern for each resilient flooring product specified.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 60 00 - Product Requirements for additional storage and handling requirements.
- B. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- C. Store all materials off of the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

1.8 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.9 CLOSEOUT SUBMITTALS

- A. See Section 01 70 00 - Execution and Closeout Requirements for closeout procedures.
- B. Furnish 10 percent of installed vinyl tile flooring and base, 5 percent of installed linoleum flooring and 5 percent of rubber flooring of each type and color specified. Deliver all required overage and maintenance stock to owner's specified location prior to start of installation.
- C. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials and suggested schedule for cleaning, stripping and re-waxing.

PART 2 PRODUCTS

2.1 TILE FLOORING

- A. Manufacturers:
 - 1. Interface: www.interface.com
 - 2. Shaw Contract: <https://www.shawcontract.com/>
 - 3. Roppe; <https://roppe.com/>
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Luxury Vinyl Tile (LVT-1,3): Class III Printed Vinyl Plank.
 - 1. Manufacturers:
 - a. Shaw Contract; <https://www.shawcontract.com/> .
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 4. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with UL 2824.
 - 5. Plank Size: 9 by 48 inch.
 - 6. Wear Layer Thickness: 20 mil.
 - 7. Total Thickness: 5 mm.
 - 8. Installation Method(s): Ashlar/Non-directional -- Refer to Drawings
 - 9. Color(s): Refer to Finish Key/Schedule.
 - 10. Basis of Design:
 - a. Shaw Contract: Inlet Series

- C. Luxury Vinyl Tile (LVT-2): Class III Printed Vinyl Plank.
 - 1. Manufacturers:
 - a. Shaw Contract; <https://www.shawcontract.com/> .
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 4. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with UL 2824.
 - 5. Tile Size: : 9 by 48 inch.
 - 6. Wear Layer Thickness: 20 mil.
 - 7. Total Thickness: 5 mm.
 - 8. Installation Method(s): Ashlar/Non-directional -- Refer to Drawings
 - 9. Color(s): Refer to Finish Key/Schedule.
 - 10. Basis of Design:
 - a. Shaw Contract: Cove Series

- D. Rubber Tile RF-1 (010): Homogeneous color and pattern throughout thickness.
 - 1. Manufacturers:
 - a. Roppe Corporation; Rubber Tile: www.roppe.com/#sle.
 - b. Nora Flooring
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 - 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 E 648 or NFPA 253.
4. Size: 19 11/16 by 19 11/16 inch.
5. Total Thickness: 1/8 inch.
6. Texture: Raised circles.
7. Color: Refer to Finish key and Schedule..
8. Basis of Design:
 - a. Roppe: 996 Vantage Design

2.2 STAIR COVERING

- A. Stair Treads with Integral Risers: Rubber; full height of riser, full width and depth of tread in one piece; tapered thickness.
 1. Manufacturers:
 - a. Roppe Corporation: www.roppe.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 3. Nosing: Square.
 4. Striping: 2 inch wide contrasting color strips.
 5. Tread Texture: Raised.
 6. Color: As indicated on drawings.
 7. Product:
 - a. Basis of Design: Roppe; 96 Vantage; <https://roppe.com/>

2.3 RESILIENT BASE

- A. Resilient Base - Type RB-1,2: ASTM F1861, Type TV, vinyl, thermoplastic; style as scheduled.
 1. Manufacturers:
 - a. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - b. Roppe Corporation: www.roppe.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 3. Height: 4 inch, 6 inch as scheduled.
 4. Thickness: 0.125 inch.
 5. Finish: Matte.
 6. Length: Roll.
 7. Color: Refer to Finish Key and Schedule.
 8. Accessories: Premolded external corners and end stops.

2.4 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Same material as flooring.
 1. Product: Slim Line Transitions manufactured by Johnsonite.
 2. Thickness: As required by installation and to comply with ADA Regulations.
 3. Color: Color to be selected from Manufacturer's Color Palette A.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. 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.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 05 61.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
 - 3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface. Fill excessive low areas with self leveling flowable fill. Reduce ridges or bumps by grinding.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate to remove adhesives, coatings or contaminants that will inhibit adhesion of the new floor system. Use chemical treatment or bead blast as dictated by the existing conditions and as recommended by the flooring manufacturer .
- 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. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.4 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. Install tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Install plank tile in Ashlar pattern, with a random offset of at least 6 inches from adjacent rows. Allow minimum 1/2 full plank width at room or area perimeter.

3.5 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, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.
- E. Reveal Base: Miter all corners.

3.6 INSTALLATION - STAIR COVERINGS

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Adhere over entire surface. Fit accurately and securely.

3.7 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal and maintain in accordance with manufacturer's instructions.

3.8 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Prohibit traffic on resilient flooring for 48 hours after installation.
- C. Upon completion of installation, protect resilient flooring in traffic areas with heavy duty kraft paper.

3.9 SCHEDULE

- A. Refer to Finish Keys and Schedules

END OF SECTION

SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Carpet tile, fully adhered, and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01 74 19 - Construction Waste Management and Disposal: Reclamation/Recycling of new carpet tile scrap.
- C. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.
- D. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- E. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- F. Section 09 65 00 -Resilient Flooring: Base finish and termination edging of adjacent floor finish.

1.3 REFERENCE STANDARDS

- A. CRI 104 - Standard for Installation of Commercial Carpet; 2015.
- B. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
- C. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2019.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.
- D. Samples: Submit three carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Submit three, two inch long samples of edge strip.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet with minimum 5 years experience.
- C. Surface Burning Characteristics:
 1. Floor Finishes: Comply with one of the following:
 - a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
 - b. CPSC 16 CFR 1630.
- D. Smoke Density: NBS Smoke Chamber Flaming Mode 450 or less when tested in accordance with NFPA-253.
- E. Light fastness: Comply with AATCC 16-E

1.6 CLOSEOUT SUBMITTALS

- A. See Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: submit maintenance procedures, recommended maintenance materials and suggested schedule for cleaning.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum two week prior to commencing work of this section.

1.8 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.
- B. Construct carpet tile mock-up of each product type, incorporating all components specified for the location including transitions and trims.
 1. Minimum size of mock-up is 6 x 6 foot.
 2. Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
 3. Approved mock-up may remain as part of the Work upon Architect approval.

1.9 PRODUCT DELIVERY AND HANDLING

- A. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached. Maintain wrappers and protective covers in place until carpet is ready for installation.
- B. Deliver all required overages and maintenance stock to owner's specified location prior to beginning installation.

1.10 FIELD CONDITIONS

- A. Section 01 60 00 - Product Requirements.
- B. Store materials inside, protected from weather, moisture and soiling.
- C. Store materials in area of installation for minimum period of 48 hours prior to installation.

- D. Maintain minimum 70 degrees F ambient temperature 72 hours prior to, during and 24 hours after installation.
- E. Precondition: All of the carpet shall be spread in a room on site 14 days prior to actual installation with the room preconditioned at a minimum of 70 degree F with humidity between 35% to 65%.
- F. Ventilate installation area during installation and for 72 hours after installation.

1.11 EXTRA MATERIALS

- A. See Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Supply 5 percent of carpet of each type, color, and pattern specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tile Carpeting:
 - 1. Interface Carpets www.interface.com, www.flors.com
 - 2. Shaw Contract www.shawcontract.com.
 - 3. Milliken & Company: www.milliken.com/#sle.

2.2 MATERIALS

- A. Carpet Tile Type CPT-1 (009):Tufted textured loop , manufactured in one color dye lot.
 - 1. Product: manufactured by Milliken; Major Frequency One Collection; Vibration or Equal
 - 2. Tile Size: __9.84__x__39.4__ inch, nominal.
 - 3. Backing system: PVC-Free WellBAC Comfort Cushion
 - 4. Yarn manufacturer: Universal Fibers
 - 5. Yarn system: 100% Recycled Content Type 6 Nylon
 - 6. Color System: 100% Solution Dyed
 - 7. Construction: Tufted, Textured Loop
 - 8. TARR Rating: Severe
 - 9. Flooring Radiant Panel: ASTM E-648 Class 1
 - 10. Pile Height: 0.13 inch.
 - 11. Color: Refer to Finish Key .
 - 12. Installation Method: Ashlar / Non directional
- B. Carpet Tile Type CPT-2 (009):Tufted tectured loop , manufactured in one color dye lot.
 - 1. Product: manufactured by Milliken; Major Frequency One Collection; Distortion or Equal
 - 2. Tile Size: __9.84__x__39.4__ inch, nominal.
 - 3. Backing system: PVC-Free WellBAC Comfort Cushion
 - 4. Yarn manufacturer: Universal Fibers
 - 5. Yarn system: 100% Recycled Content Type 6 Nylon
 - 6. Color System: 100% Solution Dyed
 - 7. Construction: Tufted, Textured Loop
 - 8. TARR Rating: Severe
 - 9. Flooring Radiant Panel: ASTM E-648 Class 1
 - 10. Pile Height: 0.14 inch.
 - 11. Color: Refer to Finish Key .
 - 12. Installation Method: Ashlar / Non directional

2.3 ACCESSORIES

- A. Sub-Floor Filler: type recommended by flooring material manufacturer.
- B. Moldings and Edge Strips: Rubber, color as selected by architect.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 05 61.
 - 2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Do not mix carpet from different cartons unless from the same dye lot.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- 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.

3.4 SCHEDULE

- A. Refer to Finish Key and Schedules.

3.5 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 72 00
WALL COVERINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation and prime painting.
- B. Vinyl Wallcovering
- C. Corner Guards

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 91 23 - Interior Painting: Preparation and priming of substrate surfaces.

1.3 REFERENCE STANDARDS

- A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2002 (Reapproved 2013).
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- C. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.
- D. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on wall covering and adhesive.
- C. Shop Drawings: Indicate wall elevations with seaming layout.
- D. Samples: Submit two samples of wall covering, 12 by 12 inch in size illustrating color, finish, and texture. Verify image and substrate with Interior Designer/Architect/Owner.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Wall Covering Materials: 25 linear feet of each color and pattern of wall covering; store where directed.
 - 3. Package and label each roll by manufacturer, color and pattern, and destination room number.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Provide image full height, illustrating installed wall covering and joint seaming technique.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspect roll materials at arrival on site, to verify acceptability.
- B. Protect packaged adhesive from temperature cycling and cold temperatures.
- C. Do not store roll goods on end.

1.8 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.
- B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

PART 2 PRODUCTS

2.1 WALL COVERINGS

- A. General Requirements:
 - 1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.
 - 2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.
- B. Wall Covering - Type WC-1: Type II 20 oz. Vinyl Wallcovering.
 - 1. Comply with ASTM F793/F793M, Category V, Type II.
 - 2. Total Weight: 20 oz./ Lineal Yd.
 - 3. Roll Width: 52-54 inches.
 - 4. Backing: Non-woven, synthetic fabric.
 - 5. Color: Refer to Finish Key.
 - 6. Surface Texture: Textured.
 - 7. Flame/Smoke Certifications: NFPA 255, (ASTM E-84) Class A.
 - 8. Basis of Design:
 - a. Koroseal; Interloom. www.koroseal.com.
 - 9. Extruded Corner Guards: Adhered 90 degree high-impact vinyl acrylic corner guards.
 - a. Thickness: 0.078 nominal
 - b. Corner Radius: 1/4"
 - c. Width: 1-1/2"
 - d. Height: 8 feet or same height as wallcovering.
 - e. Finish: Wrapped with vinyl wallcovering to match WC-1
 - f. Product:

- 1) Basis of Design: Koroseal; Koroguard GW-15 series; www.koroseal.com.
- C. Custom Digital Printed Wall Covering - Type WC-2,3: Type II 20 oz. Vinyl Wallcovering.
 1. Comply with ASTM F793/F793M, Category V, Type II.
 2. Total Weight: 20 oz./ Lineal Yd.
 3. Roll Width: 54 inches.
 4. Backing: Woven, osnaburg fabric.
 5. Color: Refer to Finish Key.
 6. Surface Texture: Embossed PVC-Vinyl.
 7. Abrasion Resistance, Double Rubs/Min.:300
 8. Stain Resistance:
 - a. Washability, Double Rubs/Min:100
 - b. Scrubbability, Double Rubs/Min: 300
 9. Flame/Smoke Certifications: NFPA 265, CCCW 408 A, CCCW 408D, MEA No. 404-00-M.
 10. Basis of Design:
 - a. Surface Materials; Custom Level Digital Wallcovering, Stipple Vinyl Wallcovering: <https://www.surfacematerials.com>.
- D. Wall Covering - Type WPT-1: Type II 20 oz. Vinyl Wall Protection.
 1. Comply with ASTM F793/F793M, Category V, Type II.
 2. Total Weight: 20 oz./ Lineal Yd.
 3. Roll Width: 52-54 inches.
 4. Backing: Woven, osnaburg fabric.
 5. Color: Refer to Finish Key.
 6. Surface Texture: Textured.
 7. Tearing Strength, Scale:
 - a. Machine Direction:25
 - b. Cross Machine Direction: 25
 8. Stain Resistance:
 - a. Washability, Double Rubs/Min:100
 - b. Scrubbability, Double Rubs/Min: 300
 9. Flame/Smoke Certifications: NFPA 265, CCCW 408 A, CCCW 408D, MEA No. 404-00-M.
 10. Basis of Design:
 - a. Koroseal: Threaded <https://koroseal.com/>
- E. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.
- F. Termination Trim: Extruded plastic, color as selected.
- G. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.
- H. Substrate Primer and Sealer: Alkyd enamel type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are prime painted and ready to receive work, and comply with requirements of wall covering manufacturer.
- B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.

- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.2 PREPARATION

- A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.
- B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.
- C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.
- E. Vacuum clean surfaces free of loose particles.

3.3 INSTALLATION

- A. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- B. Apply adhesive to wall surface immediately prior to application of wall covering.
- C. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
- D. Butt edges tightly.
- E. Install termination trim.
- F. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.4 CLEANING

- A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
- B. Reinstall wall plates and accessories removed prior to work of this section.

3.5 SCHEDULES

- A. Refer to Finish Key and Schedule.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
- 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, and operating parts of equipment.
 - 5. Floors, unless specifically indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 50 00 - Metal Fabrications: Shop-primed items.
- C. Section 09 91 23 - Interior Painting.
- D. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Painted identification.
- E. Section 23 05 53 - Identification for HVAC Piping and Equipment: Painted identification.
- F. Section 26 05 53 - Identification for Electrical Systems: Painted identification.

1.3 REFERENCE STANDARDS

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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 in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - 4. 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 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.6 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 4 feet long by 4 feet wide, illustrating paint color, texture, and finish.
- C. Provide door and frame assembly illustrating paint color, texture, and finish.
- D. Locate where directed by Architect.
- E. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

- 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 exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.

PART 3 EXECUTION

3.1 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 mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

3.2 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.

- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.6 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON SHERWIN WILLIAMS UNLESS NOTED OTHERWISE.

- A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view.
 - 1. One coat of Loxon Block Surfacer(LX01W0200) @ 8.8 MDFT.
 - 2. Two coats of ConFlex Acrylic Coating (CF13W0051) @ 3.5 MDFT.
- B. Exterior Gypsum Board: Finish surfaces exposed to view.
 - 1. One coat of Loxon Masonry Primer Sealer(LX02W0050) @ 3.2 MDFT.
 - 2. Two coats of ConFlex Acrylic Coating(CF13W0051) @ 3.5 MDFT.
- C. Wood: Finish surfaces exposed to view.
 - 1. One coat of Exterior Oil-Based Wood Primer.
 - 2. Two coats Resilience Exterior Latex Satin.
- D. Aluminum: Finish surfaces exposed to view.
- E. Steel - Exposed steel lintels, Overhead doors, Frames, other Ferrous metal:
 - 1. One coat Pro Industrial Pro-Cryl Primer (B66-1300 Series) @ 1.9-3.8 MDFT.
 - 2. Two coats DTM Acylic Semi gloss Coating (B66-200 Series).
 - 3. Application: Preparation and prime coat is to be applied in factory by steel fabricator.

3.7 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON PPG UNLESS NOTED OTHERWISE.

- A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view.
 - 1. One coat of Perma-Crete Block & Masonry Surfacer/Filler 4-100XI @ 8.0 to 11.0 MDFT.
 - 2. Two coats of Perma-Crete 4-22 HB Acrylic Flat @ 3.2 to 5.8 MDFT.
- B. Exterior Gypsum Board: Finish surfaces exposed to view.
 - 1. One coat of Perma-Crete 4-603XI Alkali resistant primer @ 1.4 MDFT, minimum.
 - 2. Two coats of Perma-Crete 4-22 HB Acrylic Flat @ 3.2 to 5.8 MDFT.
- C. Wood: Finish surfaces exposed to view.
 - 1. One coat of Exterior Oil-Based Wood Primer.
 - 2. Two coats of Acri-Shield Max Exterior Latex Satin.

- D. Steel - Exposed steel lintels, Overhead doors, Frames, other Ferrous metal:
1. One coat of Speed Hide One-component, interior/exterior rust inhibitive steel primer 6-208 Series.
 2. Two coats of Pitt-Tech Plus Int./Ext Semi-Gloss Industrial Coating 90-1610 HP Series.
 3. Application: Preparation and prime coat is to be applied in factory by steel fabricator.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.1 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. Elevator pit ladders.
 - 3. Surfaces inside cabinets.
 - 4. Prime surfaces to receive wall coverings.
 - 5. Exposed walls and bottom of swimming pools and fountains.
 - 6. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
 - 6. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Glass.
 - 9. Acoustical materials, unless specifically indicated.
 - 10. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 50 00 - Metal Fabrications: Shop-primed items.
- C. Section 09 91 13 - Exterior Painting.

1.3 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.4 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; 2016.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).
- D. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application; 2018.
- E. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.
- F. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- G. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- H. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- I. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- J. SSPC-SP 3 - Power Tool Cleaning; 2018.
- K. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- L. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.5 SUBMITTALS

- A. See Section 01 30 00 - 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 products to be used in project; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - 4. 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 01 60 00 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 10 years experience and approved by manufacturer.

1.7 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 10 feet long by 10 feet wide, illustrating paint color, texture, and finish.
- C. Provide door and frame assembly illustrating paint color, texture, and finish.
- D. Locate where directed by Architect.
- E. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- 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. 6 CRR-NY, Chapter III, Subpart A.
 - c. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
 - 1) Opaque, Flat: 50 g/L, maximum.
 - 2) Opaque, Nonflat: 100 g/L, maximum.
 - 3) Opaque, High Gloss: 150 g/L, maximum.
 - d. Architectural coatings VOC limits of the State of New York.
 - 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. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.
 - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been adequately 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 affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.

- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. 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.
 - 5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 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. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Clean concrete according to ASTM D4258. Allow to dry.
 - 3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- H. Concrete Floors and Traffic Surfaces: Remove contamination, using alkaline based cleaners where required, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- J. 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.
- K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- L. 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.
- M. 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 methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.
- N. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

- O. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

3.3 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. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.
- B. Owner will provide field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.7 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON SHERWIN WILLIAMS UNLESS NOTED OTHERWISE.

- A. Concrete Block:
 - 1. One coat Preprite Block Filler (B25) DFT- 8.0. (MPI #4)
 - 2. Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
- B. Concrete:
 - 1. One coat Preprite Masonry Primer (B28W300) @ 3.0 MDFT. (MPI #149)
 - 2. Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
- C. Concrete Floors (Lt. - Med. Duty):
 - 1. Unpainted Floors:
 - a. One coat ArmorSeal 8100 Water Based Epoxy Floor Coating (B70 Series) reduced with one pint of water per gallon @ 2.0-4.0 DMFT.
 - b. Two coats ArmorSeal 8100 Water Based Epoxy Floor Coating (B70 Series) unreduced @ 2.0-4.0 MDFT per coat.
 - 2. Previously Painted Floors:

- a. Spot Prime bare areas with one coat ArmorSeal 8100 Water Based Epoxy Floor Coating (B70 Series) unreduced @ 2.0-4.0 DMFT.
 - b. Two coats ArmorSeal 8100 Water Based Epoxy Floor Coating (B70 Series) unreduced @ 2.0-4.0 MDFT per coat.
- D. Steel and Metal - Steel access doors and frames, hollow metal doors and frames, all new removable mullions, stair railings, hollow metal Windows frames, existing painted fire extinguisher cabinets:
1. One coat Pro Industrial Pro-Cryl Primer (B66-1300 Series) @ 1.9-3.8 MDFT.
 2. Two coats DTM Acrylic Semi-Gloss Coating (B66-200) @ 2.5-5.0 MDFT per coat.
- E. Galvanized Metal: Exposed miscellaneous metal, exposed ducts, conduits, mechanical and electrical devices.
1. One coat DTM Acrylic Primer/Finish (B66W1) @ 2.5-5.0 MDFT. (MPI #134)
 2. Two coats DTM Acrylic Semi-Gloss Coating (B66-200) @ 2.5-4.0 MDFT per coat. (MPI #153)
- F. Aluminum - Mill Finish:
1. Two coats DTM Acrylic Gloss Coating (B66-100) @ 2.5-4.0 MDFT per coat. (MPI #114)
- G. Steel - Exposed steel lintels:
1. One coat Pro Industrial Pro-Cryl Primer (B66-1300 Series) @ 1.9-3.8 MDFT.
 2. Two coats Sher-Cryl HPA High Performance Acrylic, (B66-300 Series) @ 2.5-4.0 MDFT.
 3. Application: Preparation and prime coat is to be applied including previously primed in factory by steel fabricator.
- H. Gypsum Board: Finish surfaces exposed to view.
1. All interior drywall gypsum board wall surfaces for a painted finish. (Spot prime all areas containing joint compound with primer first)
 - a. Walls and ceilings: One coat Pro Mar 200 Zero VOC Primer (B28) DFT- 1.0. (MPI #50).
 - b. Walls: Two coats SuperPaint Air Purifying Technology (A87) @ 1.8 MDFT
 - c. Ceilings: Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
- I. Plaster: Finish surfaces exposed to view.
1. All interior plastered wall surfaces for a painted finish. (Spot prime all areas containing raw plaster with primer first)
 - a. Walls and ceilings: One coat Pro Mar 200 Zero VOC Primer (B28) DFT- 1.0. (MPI #50).
 - b. Walls: Two coats SuperPaint Air Purifying Technology (A87) @ 1.8 MDFT
 - c. Ceilings: Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
- J. New Wood Casework: See Section 06 41 00 - Architectural Wood Casework, for required factory finish.
- K. New Wood Doors: Refer to appropriate door specification for required factory finish.
- L. Wood (Existing) - Varnished:
1. Two coats Minwax Performance Series Interior Wood Stain 250 VOC A 49 Series.
 2. Two coats Minwax Fast Dry Polyurethane (154-3453 Satin, 154-8890 Semi-Gloss, or 154-3479 Gloss finish.
 3. ** Number of coats dependent upon final inspection by architect/owner.
- 3.8 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON PPG UNLESS NOTED OTHERWISE.
- A. Concrete Block:
1. One coat Speedhide Masonry Hi Fill Latex Block Filler, 6-15XI. (MPI #4)
 2. Two coats Copper Armor Interior Latex, 29-1510, Semi-Gloss.

- B. Concrete:
 - 1. One coat Perma-Crete Interior/Exterior Alkali Resistant Primer, 4-603XI Series. (MPI #3)
 - 2. Two coats Pure Performance Interior Latex, 9-510XI Series, Semi-Gloss. (MPI #147)
- C. Concrete Floors (Lt. - Med. Duty):
 - 1. One coat Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer Stain, 4-6200XI. (MPI #99)
 - 2. Two coats Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer Stain, 4-6200XI. (MPI #99)
- D. Steel and Metal - Steel access doors and frames, hollow metal doors and frames, all new removable mullions, stair railings, hollow metal Windows frames, existing painted fire extinguisher cabinets:
 - 1. One coat Pitt-Tech Plus DTM Industrial Primer/Finish 4020.
 - 2. Two coats Pitt-Tech Plus EP DTM Acrylic, Semi-Gloss 90-1610 Series.
- E. Galvanized Metal: Exposed miscellaneous metal, exposed ducts, conduits, mechanical and electrical devices.
 - 1. One coat Pitt-Tech Plus DTM Industrial Primer/Finish, 4020.
 - 2. Two coats Pitt-Tech Plus EP DTM Acrylic, Semi-Gloss 90-1610 Series. (MPI #153)
- F. Aluminum - Mill Finish:
 - 1. One Coat Pitt-Tech Plus DTM Industrial Primer/Finish 4020 over abraded surface.
 - 2. Two coats Pitt-Tech Plus WB DTM Industrial Enamel, 90-1310 Series, Gloss. (MPI #154).
- G. Steel - Exposed steel lintels:
 - 1. One coat Pitt-Tech Plus DTM Industrial Primer/Finish 4020.
 - 2. Two coats Pitt-Tech Plus EP DTM Acrylic Gloss 90-1510.
- H. Gypsum Board: Finish surfaces exposed to view.
 - 1. All interior drywall gypsum board wall surfaces for a painted finish. (Spot prime all joints and spots with primer first)
 - a. Walls and ceilings: Two coats Pure Performance Interior Latex Primer, 9-900.
 - b. Walls: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)
 - c. Ceilings: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)
 - d. Exception: Where topcoat is indicated or scheduled as white, provide UltraLast Interior, Eggshell.
- I. Plaster: Finish surfaces exposed to view.
 - 1. All interior plastered wall surfaces for a painted finish. (Spot prime all joints and spots with primer first)
 - a. Walls and ceilings: Two coats Pure Performance Interior Latex Primer, 9-900.
 - b. Walls: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)
 - c. Ceilings: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)
 - d. Exception: Where topcoat is indicated or scheduled as white, provide UltraLast Interior, Eggshell.
- J. New Wood Casework: See Section 06 41 00 - Architectural Wood Casework, for required factory finish.
- K. New Wood Doors: Refer to appropriate door specification for required factory finish.

3.9 SCHEDULE

- A. Refer to Finish Key and Schedule on Drawings.

END OF SECTION

SECTION 10 11 00
VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass markerboards.
- B. Glass markerboard sliding wall system.
- C. Glass markerboard wall.
- D. Tackable wall panels.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 09 21 16 - Gypsum Board Assemblies: Concealed supports in metal stud walls.
- C. Section 09 91 23 - Interior Painting: Finishing of wood frame and marker rail.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- C. ANSI A208.1 - American National Standard for Particleboard; 2016.
- D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- E. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
- F. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012 (Reapproved 2017).
- G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- J. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.
- K. PS 1 - Structural Plywood; 2009.
- L. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.

- D. Samples: Two, 2 by 2 inches in size illustrating materials and finish, color and texture of chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surfacing, and trim.
- E. Maintenance Data: Include data on regular cleaning, and stain removal .

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for chalkboard and markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.1 VISUAL DISPLAY UNITS

- A. Magnetic Glass Markerboards:
 - 1. Manufacturers:
 - a. Basis of Design: Claridge Products and Equipment, Inc:
www.claridgeproducts.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Glass: Laminated, low iron, 1/4 inch thick, with bevel edges and radiused corners, laminated to steel backing sheet for use with magnets. Coated or treated for use as dry erase board or projection surface.
 - 3. Steel Backing Sheet Thickness: 24 gauge, 0.0239 inch .
 - 4. Size: As indicated on drawings.
 - 5. Frame: No frame, with concealed fasteners.
 - 6. Mounting: Concealed Z clips, unless noted otherwise.
 - 7. Accessories: Provide magnetic marker tray and magnetic marker holder.
 - 8. Accessories: Provide compatible rare earth magnets for each glass board: standard quantity; Provide 4.
 - 9. Accessories: Provide 4 additional rare earth magnets per glass board.
- B. Tackboards: Vinyl coated fabric roll stock, conforming to the following.
 - 1. Fabric: Vinyl-coated fabric.
 - 2. Color: As selected from manufacturer's full range.
 - 3. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
 - 4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 - 5. Size: As indicated on drawings.
 - 6. Frame: Same type and finish as for markerboard.
- C. Glass Markerboard Sliding Wall System:
 - 1. Manufacturers:
 - a. Basis of Design: Claridge Products and Equipment, Inc:
www.claridgeproducts.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Size: As indicated on drawings.
 - 3. Frame: Extruded aluminum, with concealed fasteners.

4. Frame Finish: Anodized, natural.
 5. Configuration:
 - a. Two-Track:
 - 1) Two Sliding Panels: Each panel not less than one-half of unit length.
 6. Sliding Magnetic Glass Markerboard Panels:
 - a. Glass: Laminated, low iron, 1/4 inch thick, with bevel edges and radiused corners, laminated to steel backing sheet for use with magnets. Coated or treated for use as dry-erase board or projection surface.
 - b. Glass Finish: White back coating.
 - c. Size: As indicated on drawings.
 - d. Ball Bearing Nylon Rollers: Two per panel up to 4 feet wide and three per panel up to 8 feet wide.
 - e. Finger Pulls: One pair per sliding panel.
 7. Accessories: Provide marker tray and map rail. with 8 total rare earth magnets per board.
- D. Magnetic Glass Markerboard Wall: Room-size presentation surface made of multiple floor-to-ceiling glass panels.
1. Manufacturers:
 - a. Basis of Design: Claridge Products and Equipment, Inc:
www.claridgeproducts.com/#sle. "Glass Marker Wall"
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Glass: Back-coated glass, laminated, low iron, 1/4 inch thick, with bevel edges and radiused corners, laminated to steel backing sheet for use with magnets. Coated or treated for use as dry-erase board or projection surface.
 3. Steel Backing Sheet Thickness: 24 gauge, 0.0239 inch .
 4. Size: As indicated on drawings.
 5. Panel Width: 48 inches.
 6. Frame Finish: Anodized, natural.
 7. Mounting: Concealed Z clips.
 8. Accessories: Provide magnetic marker tray and magnetic marker holder, and 8 total rare earth magnets per board.
- E. Tackable Wall Panels: Fabric laminated to fiberboard; Factory-fabricated.
1. Fabric: Refer to Finish Key.
 2. Color, Pattern, Texture: As selected from manufacturer's full range.
 3. Size: As indicated on drawings.
- F. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
 2. Configuration: As indicated on drawings.

2.2 MATERIALS

- A. Float Glass: Provide float-glass-based glazing unless otherwise indicated.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 1. Laminated Safety Glass: Comply with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
- C. Vinyl-Coated Fabric: ASTM F793/F793M Category VI.
- D. Aluminum Sheet Backing: 24 gauge, 0.0239 inch thick.
- E. Adhesives: Type used by manufacturer.

2.3 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.
- B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.
- C. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- D. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.
- E. Cleaning Instruction Plate: Provide instructions for markerboard cleaning on a metal plate fastened to perimeter frame near chalkrail.
- F. Marker Tray: Aluminum, manufacturer's standard extruded profile closed ends; concealed fasteners, same finish as frame.
- G. Mounting Brackets: Concealed.
- H. Rare Earth Magnets compatible with glass marker boards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.2 PREPARATION

- A. Acclimatize tackable wall panels by removing from packaging in installation area not less than 24 hours before application.
- B. Remove switchplates, wall plates, and surface-mounted fixtures where tackable wall paneling is applied. Reinstall items on completion of installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.
- C. Butt Joints: Install with tight hairline joints.
- D. Install tackable wall panels in accordance with manufacturer's recommendations on specified substrates with concealed attachments.
 - 1. Fabricate re-wrapped edges where partial panels abut each other, or adjacent surfaces or trim.
 - 2. Re-wrap top, bottom or side edges for cutting panels around door or window openings, abutting trim, protruding objects, and at other openings, including x-cut at receptacles, light switches, and other openings.

3.4 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 14 23
PANEL SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Panel signage.

1.2 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
 - 2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - c. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.
- E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.
- F. Verification Samples: Submit samples showing colors, materials, and finishes specified.
- G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- H. Manufacturer's qualification statement.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store under cover and elevated above grade.
- D. Store tape adhesive at normal room temperature.

1.6 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Panel Signage:
 - 1. ASI Sign Systems, Inc: www.asisignage.com
 - 2. ID Signsystems: www.idsignsystems.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 REGULATORY REQUIREMENTS

- A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.
- B. Surface burning characteristics: Maximum flame spread of 25 (Class A) when tested in accordance with ASTM E84.

2.3 PANEL SIGNAGE

- A. Panel Signage Type 9,11,33:
 - 1. Application: Room and door signs.
 - 2. Description: Flat signs co-molded media, tactile characters.
 - 3. Sign Size: As indicated on drawings.
 - 4. Total Thickness: 1/8 inch.
 - 5. Sign Edges: Squared.
 - 6. Corners: Squared.
 - 7. Color and Font, unless otherwise indicated:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper case only.
 - c. Background Color: Clear.
 - d. Character Color: Contrasting color.
 - 8. Material: One-piece injection molded polycarbonate plastic with raised letters and braille.
 - 9. Profile: Flat panel without frame.
 - 10. Tactile Letters: Raised 1/32 inch minimum.
 - 11. Braille: Grade II, ADA-compliant.
 - 12. One-Sided Wall Mounting: Tape adhesive.
 - 13. Basis of Design Product:

- a. ASI: InForm-FR.
 - b. Or Approved Equal.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Panel Signage Type 1,2,3,4:
1. Application: Room and door signs.
 2. Description: Flat signs with applied character panel media, tactile characters.
 3. Sign Size: As indicated on drawings.
 4. Total Thickness: 1/8 inch.
 5. Sign Edges: Squared.
 6. Corners: Squared.
 7. Color and Font, unless otherwise indicated:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper and lower case (title case).
 - c. Background Color: As scheduled.
 - d. Character Color: Contrasting color.
 8. Material: Acrylic plastic base with applied plastic letters and braille.
 9. Profile: Flat panel without frame.
 - a. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, nonglare on front.
 10. Tactile Letters: Raised 1/32 inch minimum.
 11. Braille: Grade II, ADA-compliant.
 12. One-Sided Wall Mounting: Tape adhesive.
 13. Basis of Design Product:
 - a. ASI: InForm-FR.
 - b. Or Approved Equal.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 SIGNAGE APPLICATIONS

- A. Room and Door Signs:
1. Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
 2. Office Doors: Identify with room names and numbers to be determined later, not those indicated on drawings; provide "window" section for replaceable occupant name.
 3. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
 4. Rest Rooms: Identify with pictograms, the names as indicated on room finish schedule located on drawings, and braille.

2.5 ACCESSORIES

- A. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

3.3 CLEANING, PROTECTION AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet interior and 10 feet exterior.
- B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.
- C. Dispose of construction debris.

3.4 SCHEDULE

- A. Refer to Signage Schedule, Signage Type Schedule and Drawings for sizes, locations and layout of signage types, sign text copy and graphics.

END OF SECTION

SECTION 10 21 23
CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended overhead curtain track and guides.
- B. Surface mounted overhead curtain track and guides.
- C. Cubicle curtains.

1.2 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications: Track supports above ceiling.
- B. Section 06 10 00 - Rough Carpentry: Blocking and supports for track.
- C. Section 09 51 00 - Acoustical Ceilings: Suspended ceiling system to support track.

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and track.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Samples: Submit 12 by 12 inch sample patch of curtain cloth with representative top, bottom, and edge hem stitch detail, heading with reinforcement and carrier attachment to curtain header.
- E. Samples: Submit 12 inch sample length of curtain track including typical splice, wall and ceiling hanger, and escutcheon.
- F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept curtain materials on site and inspect for damage.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cubicle Track and Curtains:
 - 1. Basis of Design: On the Right Track Systems, Inc.:www.ontherighttrack.com
 - 2. Carnegie: <https://carnegiefabrics.com/>.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TRACKS AND TRACK COMPONENTS

- A. Tracks: Extruded aluminum sections; one piece per track run.
 - 1. Profile: Channel.
 - 2. Mounting: Surface.
 - 3. Hanger and Track Connector - mounted to ceiling grid. Provide all accessories for full assembly.
 - 4. Track End Stop: To fit track section.
 - 5. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
 - 6. Suspension Rods: Tubular aluminum sections, sized to support design loads and designed to receive attachment from track and ceiling support.
 - 7. Escutcheons: Where suspension rod meets finished ceiling or structure, provide escutcheons to match rod finish.
 - 8. Finish on Exposed Surfaces: white powder coated.
- B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
- C. Wand: Plastic, attached to lead carrier, for pull-to-close action.
- D. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.3 CURTAINS

- A. Cubicle Curtains:
 - 1. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
 - 2. Material: Close weave polyester; anti-bacterial, self deodorizing, sanitized, and preshrunk.
 - 3. Color/Pattern: Refer to Finish Key.
 - 4. Basis of Design: Carnegie; Privacy Curtain, Ombre.
- B. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.
- C. Curtain Fabrication:
 - 1. Width of curtain to be 10 percent wider than track length.
 - 2. Length of curtain to end 15 inches above finished floor.
 - 3. Include open mesh cloth at top 20 inches of curtain for room air circulation, attached to curtain as specified above.

4. Curtain Heading: Fabric band matching curtain panel with metal grommet holes for carriers spaced 6 inches on center.
5. Seams and Hems: Manufacturer's standard fabrication method for securely sewn and finished seams and hems.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
- C. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Secure track to ceiling system.
- C. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial toilet accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Placement of concealed wood blocking and backing plates for support of accessories.
- B. Section 09 30 00 - Tiling: Ceramic washroom accessories.

1.3 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- E. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- H. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Samples: Submit two samples of each accessory, illustrating color and finish.
- D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Commercial Toilet, Shower, and Bath Accessories:
 - 1. American Specialties, Inc (ASI): www.americanspecialties.com.
 - 2. Bobrick Washroom Equipment, Inc.: www.bobrick.com
 - 3. Bradley Corporation: www.bradleycorp.com/#sle.
 - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Provide products of each category type by single manufacturer.

2.2 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide the keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

2.4 COMMERCIAL TOILET ACCESSORIES

- A. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.
 - 1. Size: As scheduled. #600 (ASI), 18 x 30
 - 2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 - 4. Fixed Tilt Mirrors: Minimum 3 inches tilt from top to bottom.
 - 5. Products:
 - a. American Specialties, Inc: www.americanspecialties.com/#sle.
- B. Grab Bars: Stainless steel, smooth surface.

1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Finish: Satin.
 - d. Length and Configuration: As indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.
- D. See Section 06 10 00 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
 1. Grab Bars: As indicated on drawings.
 2. Other Accessories: As indicated on drawings.

3.4 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire blankets.
- C. Fire extinguisher cabinets.
- D. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 04 20 00 - Unit Masonry: Roughed-in wall openings.
- C. Section 09 21 16 - Gypsum Board Assemblies: Execution requirements for placement of rough-in frame for cabinets.
- D. Section 09 91 23 - Interior Painting: Field paint finish.

1.3 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2017, with Errata (2018).
- B. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.5 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire Extinguisher Cabinets and Accessories:
 - 1. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
 - 1. Class: A.
 - 2. Size: 5 pound.
 - 3. Finish: Baked enamel, red color.

2.3 FIRE EXTINGUISHER CABINETS

- A. Fire Rated Cabinet Construction: One-hour fire rated.
 - 1. Steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
- B. Cabinet Configuration: Recessed type.
 - 1. Size to accommodate accessories.
 - 2. Trim: Flat square edge, with 2 inch wide face.
 - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- C. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch. Provide satin finish pull handle.
- D. Door Glazing: Plastic, clear, 1/8 inch thick acrylic. Set in resilient channel gasket glazing. Formed in a bubble shape to allow full 180 degree visibility.
- E. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- F. Fabrication: Weld, fill, and grind components smooth.
- G. Finish of Cabinet Exterior Trim and Door: No.4 - Brushed stainless steel.
- H. Finish of Cabinet Interior: White colored enamel.

2.4 ACCESSORIES

- A. Fire Blanket: Fire retardant treated wool; red, 62 x 84 inch size.
- B. Fire Blanket Cabinet: Drop type with folded blanket, surface mounted.
- C. Extinguisher Brackets: Formed steel, chrome-plated.
- D. Cabinet Signage: Lettering applied to back of plastic vision panel that reads "Fire Extinguisher", and graphic identification symbol..

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.
- D. Position cabinet signage at the back of the plastic vision panel.
- E. Provide a cabinet, extinguisher and accessories at 75' maximum along the length of the corridors.
- F. Portable fire extinguishers (Surface Mounted Units): Install wall bracket by securely anchoring to masonry wall or wood blocking within a stud wall. Place extinguisher in bracket.

END OF SECTION

SECTION 10 56 13
METAL STORAGE SHELVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Four post shelving.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and reinforcement in walls for anchoring shelving units.

1.3 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Rated uniform shelf loads.
 - 2. Details of shelving assemblies, including reinforcement.
 - 3. Accessories.
- C. Test Reports: Provide independent agency test reports documenting compliance with specified structural requirements.
- D. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.
 - 1. Indicate methods of achieving specified anchoring requirements.
- E. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and finishes.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspect for dents, scratches, or other damage. Replace damaged units.
- B. Store in manufacturer's unopened packaging until ready for installation.
- C. Store under cover and elevated above grade.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

- B. Provide one year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Four Post Shelving:
 - 1. ASI Storage Solutions: www.asi-storage.com/#sle.
 - 2. Hallowell: www.hallowell-list.com/#sle.
 - 3. List Industries, Inc: www.listindustries.com/#sle.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 SHELVING - GENERAL

- A. See drawings for layout and sizes.
- B. Anchors: Provide anchoring hardware to secure each shelving unit to floor and wall.
 - 1. Provide hardware of type recommended by manufacturer for substrate.

2.3 FOUR POST SHELVING

- A. Basis of Design; Hallowell- H-Post High Capacity Shelving Units. Four Post Shelving: Steel post-and-beam type with sway bracing, shelving brackets, shelving surfaces, and accessories as specified.
 - 1. Unit Width: 36 - 48 inches, center to center of posts.
 - 2. Shelf Capacity: Uniform distributed load of 50 psf, minimum.
 - 3. Adjustability of Shelving: Continuous along length of post.
 - 4. Shelf Depth: 30 inches, minimum.
 - 5. Finish: Baked enamel, medium gloss.
- B. Posts and Beams: Formed sheet members; perforations exposed on face of members are not acceptable.
 - 1. Metal Thickness: 16 gauge, 0.0598 inch.
 - 2. Post Shape: Tee intermediate posts, angle end posts forming corners.
 - 3. Post Face Width: 2 inches, maximum.
 - 4. Connecting Hardware: Manufacturer's standard.
- C. Bracing: Formed sheet members.
 - 1. Back Sway Bracing: Either strap or panel; at back of each unit.
 - 2. Side Sway Bracing: Either strap or panel; at each side of each unit.
 - 3. Strap Sway Bracing: One strap installed diagonally, 16 gauge, 0.0598 inch; welded, riveted, or bolted to uprights.
 - 4. Panel Sway Bracing: Formed sheet metal panels, 20 gauge, 0.0359 inch; welded, riveted, or bolted to uprights.
- D. Shelves: Formed stainless steel wire; brushed or satin finish; cut ends concealed or smoothed for safety.
 - 1. Wire Diameter: 1/8 inch, minimum.
 - 2. Maximum Opening Dimension: 1/4 inch, maximum.
 - 3. Shelf Edge Profile: Extending 3/4 inch high, maximum, below top surface of shelf.
 - 4. Shelf Connection to Posts: Manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate is level and that clearances are as specified.
- B. Verify that walls are suitable for shelving attachment.
- C. Do not begin installation until substrates have been properly prepared.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.
- C. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.
- D. Out-Of-Square Tolerance - Four Post Shelving: Maximum of 1/8 inch difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.4 CLEANING

- A. Clean shelving and surrounding area after installation.

3.5 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 11 40 00
FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Supply, deliver and set in place all food service equipment at identified locations, and level before and after final connections by others.

1.3 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, which 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.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by Contract Documents. Substitutions require approval by Architect for use or implementation.
 - 1. Substitutions provisions are handled under Division 01 Section.

1.4 REFERENCES

- A. All Food Service Equipment provided and installed must comply with below agencies, state department of health and county or local laws and ordinance.

- B. American Society for Testing Materials (ASTM):
 1. ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 2. ASTM A446, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
 3. ASTM C1036, Specification for Flat Glass.
 4. ASTM C1048, Specification for Heat Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
- C. American Welding Society (AWS).
- D. National Electrical Manufacturers Association (NEMA).
- E. National Fire Protection Association (NFPA 96).
- F. National Sanitation Foundation (NSF).
- G. Underwriters Laboratories Listing (UL).

1.5 SUBMITTALS

- A. Within sixty (60) days after award of contract (before equipment is purchased) the flowing shall be submitted in accordance with Section 013300 SUBMITAL PROCEDURES. It shall be the responsibility of the FEC (Food Equipment Contractor) to confirm construction schedule with Architect and adjust the submittal process to accommodate any fast track project.
 1. The submittal package will include the following: Product data book (cut sheet book) this product data book should account for all item numbers in this contract up to and including spare numbers and existing equipment. Product data cut sheets shall be marked up in a way that indicates model and accessories included with the item.
 2. Submittal drawings will consist of the following: Custom shop drawings (hoods, walk-ins, millwork, serving lines custom fabrication, etc.) Equipment layout drawings, Plumbing connection drawings, electrical connection drawings, HVAC layout drawings and Special condition drawings (Wall backing, floor depressions, etc.)
 3. All submittal packages shall be at least 98% complete at submission, unless pre-approved by Architect and the Food Service Consultant
- B. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.
- C. Drawing of fabricated equipment shall not be less than $\frac{3}{4}$ " equal one-foot scale.
- D. Rough-in drawings shall not be less than $\frac{1}{4}$ " equal one-foot scale.

- E. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.
- F. Samples: Submit samples of stainless steel and other finish materials for color selection.
- G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- H. Manufacturer's Certificate: Certify that exhaust system and tests meet or exceed specified requirements.
- I. It shall be the FEC responsibility to coordinate all color selections that are not already selected with Architect. Any color selections stated in written specifications shall be confirmed by the FEC with Architect prior to ordering.

1.6 CLOSEOUT SUBMITTALS

- A. Within thirty (30) days after completion of contract the following shall be submitted.
 - 1. Operation and Maintenance Data:
 - a. Operation Data: Provide manuals with a sequence of operation and utility connection diagram explaining system operation and corresponding to actual devices. After approval, submit 2 sets of three ring binders and an electronic copy.
 - b. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.
 - c. Within this manual Provide serial numbers on all equipment including walk in boxes and refrigeration when manual covers more than one model, indicate model provided
 - 2. Warranty letter by the FEC (Food Service Equipment Contractor) stating date of completion of installation for warranty issues.
 - 3. Demonstration sign in sheet listing what was demonstrated and all parties that attended this demonstration
 - 4. Equipment keys and spare parts list to include what was turned over and to whom.
 - 5. Signed by owner or owner's representative the punch list determining that all punch list items have been completed and to the owner's satisfaction.
 - 6. Provide documentation on all cooking equipment startups performed by an authorized service agent.
 - 7. Documentation of startups by authorized service agent
 - 8. Provide copy of Ansul tag and testing

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Conform to applicable State and local codes for utility requirements.
 - 2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.
- B. Energy Ratings: Provide appliances with energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade

Commission.

1. Provide all appliances that are Energy Star Rated.

1.8 QUALIFICATIONS

- A. Installer: Must have a minimum of 5 years documented installation experience with projects similar to this project.
- B. Fabricator: Must specialize in manufacture of commercial food services equipment with minimum 5 years documented experience.
- C. Manufacturer: Must specialize in manufacturing products specified in this section with a minimum of 5 years documented equipment manufacturing experience.
- D. One qualified full-time site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.
 1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Store products clear of floor in a manner to prevent damage.
- B. Coordinate size of access and route to place of equipment installation.
- C. Coordinate equipment delivery and installation with all other trades.
- D. Contractor takes all responsibility for equipment damage incurred before, during and after installation, until Substantial Completion has been determined by Architect.
- E. One site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.
 1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant.

1.10 COORDINATION

- A. Coordinate existing equipment with Owner per Part 3 Existing Equipment.

- B. Coordinate with other trades to ensure existing equipment is disconnected prior to removal by this contractor. Supply and install all necessary drain traps, steam traps, vents, shut-offs, valves, pipe fittings, and/or other materials to complete final plumbing and electrical or steam connections between the rough-in and the connection or connections on each piece of equipment.
- C. Ductwork and ductwork connections from hoods unless otherwise indicated.
- D. Install all drain fittings, tailpieces, faucets, operating switches, and/or starters.
- E. Coordinate sequencing of equipment installation with other trades prior to installing any piece of equipment.
- F. Coordinate special conditions with other trades, i.e. floor depression, soda line conduit requirements, roof curbs, control wiring, etc.

1.11 WARRANTY

- A. Provide a one (1) year parts and labor guarantee on all new equipment.
- B. Components of equipment subject to replacement prior to one year's use and those items which may fail due to improper or inadequate periodic maintenance by the Owner/Operator are not intended to be included within the scope of warranty.
- C. For all equipment that has refrigeration systems and semi-hermetic compressors, furnish an additional four (4) year warranty on all compressors.
- D. Guarantee/Warranty period shall commence with the date of Substantial Completion.
- E. Warranty includes all costs incurred for removal and re-installation of the replacement component or equipment.

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. All products shall be new. Use salvaged materials only where specifically directed to do so.
 - 3. 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.
 - 4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 5. Where products require color selection the Architect will make the selection.

6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or 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. Products:
 - a. 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.
 2. Manufacturers:
 3. 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.

2.2 COMPARABLE PRODUCTS

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

2.3 MATERIALS

- A. Sheet Steel: ASTM A446; 1.25 ounce per square foot galvanized coating.
- B. Stainless Steel: ASTM A167; Type 304 commercial grade, No. 4 finish.
- C. Glass: 3/16-inch float conforming to ASTM C1036 and ASTM C1048; exposed edges ground; cut or drilled to receive hardware.

- D. Plastic Laminate: NEMA LD3; 0.050-inch-thick; color as selected by Architect.
- E. Laminate Backing Sheets: LD3-BK20, 0.020-inch-thick, unfinished plastic laminate.
- F. Finish Hardware: Manufacturer's standard.
- G. Work Surfaces: As specified.
- H. Fittings: Sink drains with crumb cup and waste fittings, faucets, and electrical outlets.
- I. Service Outlet Covers and Escutcheons: Stainless steel.
- J. Service Accessories and Connections:
 - 1. Provide control switch or starter on each motor-driven appliance or heating element, under provisions of UL requirements.
 - 2. Provide internal wiring for equipment, including electrical devices, wiring controls, and switches to a common junction box.
 - 3. Provide suitable length of 4 wire cord with plugs to match building receptacles.
 - 4. Provide lamps for fixtures in equipment.
 - 5. Provide equipment with connection terminals, so that connections of plumbing, gas, steam, electrical, ventilation, and refrigeration services can be made. Where receptacles are specified for custom equipment, supply cut-outs and outlet boxes set in place accessible for connections of electrical work.

2.4 EQUIPMENT

- A. Provide rough-in hardware, supports and connections, attachment devices, closure panels, trim strips, and all accessories required for proper operation of equipment.
- B. Standard of Comparison: The specified equipment has been established to set a standard of quality and features.
- C. If substitutions require different utility/building conditions, electrical, plumbing, ventilation, etc., from those specified, a complete list of those changes for each item shall be included with the request for substitution. Any costs associated with these changes will become the responsibility of this Contractor.
- D. Verify direction of door swings.

2.5 FABRICATION

- A. General Requirements:
 - 1. Stainless Steel Fastenings and Fittings: Bolts and screws with countersunk flat heads at interior and exterior visible or accessible surfaces. Use concealed fastenings where possible
 - 2. Form edges smooth. Fabricate sheet material for work surfaces, facings, shelves, and drainboards of straight length in one continuous sheet when not over 12 feet in length.
 - 3. Fix leg-mounted units by dowelling to floor with 1/4-inch stainless steel pins, where

vibration or oscillation is anticipated.

4. Provide legs with stainless steel adjustable feet. Fasten legs to equipment securely and rigidly.
 5. Install rubber or nylon button feet or other protective device on bearing surface of any item positioned on a finished surface.
 6. Isolate rotating or reciprocating machinery to prevent noise and vibration.
 7. Provide accommodation for installation of final connections by other trades and accessibility to components such as compressors, junction boxes, etc....
 8. Grind welds of stainless steel smooth and flush; polish to match adjacent surfaces.
 9. Cut and drill components for service outlets and fixtures.
 10. Provide access panels where required to access utilities.
 11. Shop assemble work where possible.
- B. Load Carrying Counter Surfaces: Reinforce frame support system and surfaces so that surfaces may safely support a load of 200 pounds concentrated on one square foot in any area or surface with no indentation showing on surface, and with permanent set not exceeding 0.005 inches.

2.6 FINISHES

- A. Metal (Except Stainless Steel): Degrease and phosphate etch followed by primer and minimum 2 coats factory baked epoxy enamel, color as selected by Architect from manufacturer's full range of standard and custom colors.
- B. Plastic Laminate: Color as selected by Architect from manufacturer's full range of standard and custom colors.
- C. Stainless Steel: Number 4 finish (unless indicated otherwise).
- D. Bituminous Paint: Sound deaden internal surfaces of metal work and underside of metal counters and sinks.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify all existing conditions and existing equipment requirements.
- B. Verify ventilation outlets, service connections, and supports are correct and in required location.
- C. Verify operational condition of existing equipment.
- D. Report equipment discrepancies or non-operational equipment to the Architect.

3.2 INSTALLATION

- A. Pre-installation site visits are required to obtain field measurements, verify finish dimensions,

examine rough in progress and to coordinate with trades on site.

- B. Use anchoring devices appropriate for equipment and expected usage.
- C. Verify equipment is installed in accordance with the manufacturer's recommendations and requirement.
- D. Insulate to prevent electrolysis between dissimilar metals. Provide sealant to achieve clean joint without crevices.
- E. Weld and grind joints in stainless steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.
- F. Sequence installation and erection to ensure mechanical, plumbing and electrical connections are achieved in an orderly and expeditious manner.
- G. Cut, fit, and patch where necessary. Coordinate work with other trades.
- H. Cut and drill tops, backs or other elements for service outlets, fixtures, and fittings.
- I. Provide access panel or cutting and patching of items of this Section required for the installation or services of equipment.
- J. Remove and reinstall existing equipment required under this Section. Foodservice Equipment contractor shall verify condition of existing equipment prior to removal, if being reinstalled by this contractor or reused by Owner.
- K. Protect new and existing equipment during construction phase as required to prevent damage to equipment.

3.3 EXISTING EQUIPMENT

- A. The Owner reserves the right to keep any existing equipment, coordinate with Owner on removal and transportation of equipment to a location of their choice. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain.
 - 1. Prior to removal from the kitchen any equipment that is labeled existing & relocate, Existing & remains or existing & reuse, the FEC shall verify that the equipment is in working order and document via photos any damage and cleanliness Any damaged or not working equipment should be reported to GC/CM or Architect prior to moving.
- B. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain. FEC shall supply a list of salvage equipment (to include description, model, manufacture and serial number) to CM/GC/Owner for sign off prior to removal. Provide document in FSE submittal process.
- C. MEP disconnections by related trades, move, store and re-install equipment, ready for utility connection.

- D. Coordinate scope of work and timeline with Owner and other trades prior to removal of existing equipment.
- E. Clean and re-furbish existing equipment to be re-used to "like new" condition, as noted.
 - 1. Prior to removal from the kitchen any equipment that is labeled existing & relocate, Existing & remains or existing & reuse, the FEC shall verify the cleanliness of existing equipment Any overly dirty/overly damaged equipment should be reported to the GC/CM or Architect prior to moving.
- F. It is the responsibility of this contractor to provide storage as required until the piece of equipment is installed or re-installed.
- G. It is the responsibility of this contractor to evacuate refrigerant, dismantle and remove all refrigeration equipment associated with existing walk-in cooler, freezer or equipment with remote refrigeration components (if applicable).

3.4 ADJUSTING

- A. Upon completion of installation, adjust new and existing equipment and apparatus to ensure proper working order and conditions.
- B. If a new piece of equipment is not functioning properly and determined to be non-repairable in the field it shall be removed and replaced with a new piece of equipment.
- C. Inspect all equipment and run each piece of equipment through a complete operating cycle to verify that equipment is fully operational.

3.5 CLEANING

- A. Cleaning shall be conducted prior to the turnover of the kitchen to the owner
- B. Remove masking or protective covering from stainless steel and other finished surfaces, including walk in panels, door handles and trim strips
- C. Remove all packing materials and debris from jobsite.
- D. Wash and clean new and existing equipment.
- E. Polish glass, plastic, hardware and accessories, fixtures and fittings.

3.6 DEMONSTRATION AND TESTING

- A. Demonstrations MUST be conducted prior to the turnover of the kitchen to owner. FEC shall provide a sign-in sheet from the demonstration showing attendance and what items were demonstrated. This document will be included with closeout documents.
- B. All demonstrations must be coordinated by the FEC and preformed prior to kitchen turnover. All demonstrations/training to be performed by a qualified manufactures representative.

Demonstrations must include but not limited to operating procedures and maintenance.

- C. Individuals performing demonstration shall be fully knowledgeable of all operating and service aspects of equipment.
- D. Demonstrations on all new equipment shall NOT be performed by the FEC.
- E. Test existing and new equipment to confirm equipment is operating as specified prior to demonstration. All testing of new equipment shall NOT be performed by the FEC.
- F. Start-up, test, and adjust new equipment. Authorized factory technicians shall start-up equipment requiring testing and balancing, i.e. hoods, pulping systems, equipment with remote components, etc.
- G. All equipment that qualifies for factory startups will be coordinated by FEC and completed prior to equipment turn over to owner.
- H. IT SHALL BE THE RESPONSIBILITY OF THE FEC TO ENSURE THAT ALL START UPS ARE COMPLETED AND ANY RETURN TRIPS BY SERVICE AGENT TO FINISH DUE TO INCORRECT CONNECTIONS WILL BE PAID BY THIS CONTRACTOR.

PART 4 - LISTING OF FOODSERVICE EQUIPMENT

4.1 **Item 1 – Walk-In Freezer – One (1) Required**

- A. Custom Model BALLY Sectional Walk-in Cooler/ Freezer complete with doors shall be manufactured by Bally Refrigerated Boxes, Inc. drawing # 8882 Overall size of walk-in shall be approximately 8'-2 3/4" long x 14 – 5 1/2" wide x 8'-6" high, size and configuration per Bally's current drawing# 8882drawing (field verify Size).
 - 1. Foam core panels shall be Underwriters Laboratories-listed as having flame spread of 25 or lower and smoke generation of 450 or lower when tested in accordance with ASTM E-84-76. Panels shall be approved by Factory Mutual as a Class I building type. They shall be foamed using HCFC expanding agents and shall meet all current international standards.
 - 2. All work and materials shall be in full accordance with local and/or state ordinances, and with other prevailing rules or regulations.
 - 3. Panels shall consist of interior and exterior metals skins precisely foamed with steel and dies and roll-form equipment and thoroughly checked with gauges for accuracy. The metal skins shall be placed into heated molds and liquid urethane injected between them. Urethane shall be foamed-in place (poured, not frothed) and, when completely heat cured, shall bind tenaciously to the metal skins to form an insulated panel. Panels shall contain 100 percent urethane insulation and have no internal wood or structural members between the skins. To ensure tight joints, panel edges must have foamed-in-place tongues and grooves with a flexible vinyl gasket on the interior and exterior of all tongue edges. Gaskets shall be resistant to damage from oil, fats, water and detergents and must be NSF-approved. Panel thickness shall be 4" thick.
 - 4. Exterior Finish:

- a. Walls, floor and ceiling shall be Stucco-embossed aluminum.
5. Interior Finish:
 - a. Floor panels shall have ¾" Plywood foamed in panel and 1/8" aluminum Diamond Treadplate
 - b. Walls and ceiling shall be Stucco-embossed aluminum
6. All panels except corner panels shall be made in 23" and 46" widths, fully interchangeable for fast, easy assembly. Panels 11-1/2", 17-1/4" or 34-1/2" wide are to be furnished only if required to fit the allocated space. To assure perfect alignment and maximum strength, corner panels shall employ a right-angle configuration with exterior horizontal dimensions of 12" on each side. Vertical panels (except corner panels) shall be supplied in a single length up to 28' high (16" high for installations with aluminum or stainless-steel finish). For outdoor applications, single-height panels greater than 19" (16" for aluminum) or multi-tiered vertical panels must be secured to horizontal girts mounted between building columns. 8. Panels shall be equipped with Bally Speed-lok diaphragmatic joining devices. The distance between locks shall not exceed 46". Each device shall consist of a cam action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the arm is rotated, the hook engages the rod and draws the panels tightly together with cam action. Arms and rods shall be housed in individual steel pockets. Pockets on one side of the panel shall be connected to pockets on the other side in width, by the use of 2" -wide metal straps set into and completely surrounded by the insulation. When panels are joined together, these straps shall form lock-to-lock connections for extra strength.
7. Supply one (1) Super Doors 36" wide x 78" height with 1/8" DT kick plate interior and exterior. Doors are in-fitting and flush mounted. Magnetic core, thermoplastic gaskets installed on the top edge and both sides of the door shall keep the door in a closed position, forming a tight seal; a flexible, dual blade wiper gasket shall be installed at the bottom of the door. NSF-approved gaskets shall be replaceable and resistant to damage from oil, fats, water and detergent. A heavy U-channel structural steel frame around the perimeter of the door opening shall prevent racking or twisting; steel frame is to be reinforced for hardware attachment. Anti-condensate heater wire shall be concealed behind the metal edge of the doorjamb. The door panel shall also include a vapor-proof interior lamp with LED light fixture; junction box for 120v., 60 cycle, 1 phase, a.c. service (15-amp maximum); 2"-dia. flush-face dial thermometer (field mounted on 60" wide doors).
8. Hardware
 - a. Supply with each door: three spring-loaded, self-closing hinges and door closer. Provide satin aluminum finish.
9. Door Options
 - a. Provide one Observation Window in each Entrance Door - (a 14" X 14") heated observation window shall be provided in the entrance door. It consists of three panes of glass with sealed air spaces between them. The window shall be supplied with heated glass and frame and units shall be removable for replacement.)
 - b. Provide one NSF-approved Strip Curtain for each door – clear-vinyl strip curtains shall permit easy passage while minimizing air infiltration.
 - c. Bally's standard door latch hardware.
 - d. 1/8" D.T. Kickplate Int. & Ext.

- e. Interior stainless steel ramp
10. Options:
- a. Provide Pressure Relief Port in freezer compartment.
 - b. Alarm Systems -one door Provide one 75LC Multi-Monitor w/ push button, one MC1F Mag. Contacts, one (1) IP1 Panic Button, one motion detector.
 - c. Vinyl rub rail along entire exposed front and sides (verify color with Architect).
 - d. Two (2) LED Kason 1809 -3 Lights LED 14" long, including bulbs.
 - e. Provide trim strips alongside walls & closure panels along the top to finish ceiling (same finish as wall panel).
11. Construction shall be of a design approved by the National Sanitation Foundation and shall carry the NSF Label of Approval mounted on each door section.
12. Warranties
- a. Bally shall warrant that any part of the structure it supplies (except the refrigeration system and its related accessories) is free from defects in materials or workmanship under normal use and service. The insulated panel portion of the structure is warranted free from defects under normal use and service for a period of 10 years from date of installation (but in no event shall the warranty be in force for more than 10 years and 6 months from the date the product was first shipped by Bally). Panel surface condition is warranted free from defects under normal use and service for one year from installation, provided the panel is stored and installed according to Bally's instructions. Mechanical (including hardware, gasketing, Speed-lok assemblies, aluminum weather roofs) and electrical components, except refrigeration systems (which are covered by a separate warranty) are warranted to be free from defects under normal use and service for one year from date of installation. (In no case shall this portion of the warranty be in force for more than one year and six months from the date the product was first shipped by Bally.) The warranty shall not include any labor charges for replacement or repair of defective parts or refrigeration. Full warranty information is to be provided with the walk-in.
13. CONTRACTOR'S RESPONSIBILITIES:
- a. It shall be the responsibility of this Contractor to Deliver, set-in-place and completely assemble the walk-in components and refrigeration systems. Install trim strips and closure panels (as specified - securely attached and sealed with silicone) between the box and all adjoining wall and ceiling areas. Material shall be of the same type and finish as the walk-in box surface. This contractor shall verify existing building conditions and field verify size and location of space where the walk-in is scheduled to be installed. Coordinate finished floor elevation with the Architect.
 - b. Installation requirements of the walk-in box shall not be limited to but also include the following items:
 - 1) Verify that all panel to panel am locks are fully engaged and stainless cover caps are in place.
 - 2) Entrance door should close and seal on its own. Verify seal at gasket by checking for light from inside of door with interior light turned off. Adjust door hinges as required to obtain a tight seal.
 - 3) Remove all protective coating, shipping materials and packaging labels from panel surfaces, both inside and outside of the box
 - 4) Neatly seal all penetrations/gaps to prevent condensation or ice from occurring.

Seal or verify seal at all electrical conduits both internally & externally at entrance point.

- 5) Fasten door threshold plates to the floor panel using 12-24 x ½ self-tapping screws provided by Bally
 - 6) Check door lock for proper operation, key should rotate freely for 90 degrees from the open to lock position. The key should be removed from the cylinder in either the open or locked position.
 - 7) Verify door frame heater operation. Heater strikes should feel warm to the touch.
 - 8) Heat Trace required under freezer portion of walk in. FEC to provide drawing of layout of heat trace in submittal process. Heat trace and installation of heat traces shall be supplied and installed by the electrical contractor. FEC to coordinate.
- c. Refrigerant used shall be of the latest type available and shall meet all codes and governmental requirements. All condensing units shall be factory assembled using UL listed or recognized components. Evaporators shall be forced air type, designed for ceiling installation. Freezer evaporators shall come with automatic electric defrost system with time clock, fan delay thermostat, heaters and heated drain pan. Evaporators shall be UL listed or recognized.
 - d. Verify location of condensing units with Architect.
 - e. It shall be the responsibility of this Contractor to completely install all refrigeration piping and controls (including interconnection of all electric) and pipe drain lines from coils in rigid copper to the floor drain, leaving the unit ready for final connections only by other trades. Drain line heater for freezer shall be supplied and installed by this Contractor. Electrical Contractor to interwire lights to switch.

4.2 Item 1A –Walk in Freezer Refrigeration System – One Lot (1 Lot) Required

A. Custom Model BALLY

1. Freezer: One (1) Scroll Condensing Unit – BEZA 025 L8 HT3BD (208-230/3/60) 2.5 HP A/C Outdoor Scroll. Includes suction accumulator and 6 lead voltage monitor
2. One (1) Evaporator Coil SmartVapII – BLP 209LE-S2D SV+ (208-230/1/60) Evaporator coil.
3. 1 ea. Disconnect switch, fused 208-230
4. 1 heated and insulated receiver
5. Five (5) year total refrigeration parts and compressor warranty(s).
6. Refrigeration piping and control wiring by Foodservice Contractor.
7. Installation requirements of the refrigeration system shall not be limited to but include the following:
 - a. Purge refrigerant lines with nitrogen while brazing to avoid carbon formation in the line sets. Installation of a field mounted liquid line filter drier is recommended just outside the evaporator cabinet to catch any contaminants that may have entered the system during installation
 - b. Perform leak check of all factory & field installed joints and mechanical connections. Double evacuate entire system to 250microns. Weigh in and document refrigerant type and total charge for cold weather operation.
 - c. Verify that site voltage is within specifications of equipment. Supply must be 5/+10% of name plate voltage. Verify that all mechanical and connections are tight and sealed correctly

- d. Evaporator drain lines must be properly trapped to avoid moisture and contaminates from being pulled back into the walk in. When sharing common drain line, make certain to install a trap between any freezer and cooler evaporator to avoid moisture from being drain back into the freezer compartment.
 - e. Freezer drain lines must be installed using copper pipe. Freezer drains must be heated and insulated to avoid freezing of pipe. Maintain adequate slope to allow for a fast removal of moisture from the line
 - f. Check and set pressure controls with refrigeration gauges. Make certain that differential settings allow the compressor to remain offline during any off-cycle periods
 - g. Check and adjust superheat at the evaporator coil. Coolers 8-12-degree F. Maintain a minimum of 20 degrees of super heat at the compressor to avoid liquid flood back
 - h. Suction lines must be insulated properly and neatly with no gaps through the entire length of the run. This insulation should be run through the insulated Bally panel and not just up to the penetration to avoid vapor leaks at the panel juncture.
 - i. Run systems through a complete operation cycle allowing them to pull down to set point temperature including a defrost cycle to verify all functions, setting and pressures are operation as specified.
 - j. On Smart Vap Controllers-(smart electric & air defrost systems) adjust the air sensor on the rear of the evaporator coil to a distance of 6" from the face of the coil surface
 - k. Smart Vap Electric defrost controller Should be set at a factory default for defrost is on a Demand basis. Adjustment under advance menu may be required
8. Roof curb will be furnished by this contractor and installed by others. Provide Roof Products, INC model# RPES-3 equipment support, 18 ga. galvanized steel construction; 2 X 4 pressure-treated wood nailers; vertical C-channel bulkheads; one-piece outer shell with welded corners; 18 ga. galvanized counterflashing. All welds micro-sealed and prime painted after fabrication. Provide two (2) supports per condensing unit: 48" - 42" long x 16" tall (size per manufacture recommendations).

4.3 Item 2 – Freezer Shelving – One Lot (1 Lot) Required

- A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.
- B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed),
 1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.

4.4 Item 3 – Freezer Dunnage - One Lot (1 Lot) Required

- A. New Age Model
 1. 1 ea. Model 2016 Dunnage Rack, 60"W x 24"D x 8"H, all welded aluminum construction,

1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2000 lbs., NSF, Made in USA

2. 1 ea. Model 2015 Dunnage Rack, 48"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2500 lbs., NSF, Made in USA,
3. 1 ea. Model 2014 Dunnage Rack, 36"W x 24"D x 8"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 2500 lbs., NSF, Made in USA,
4. Lifetime warranty against rust & corrosion, 5-year construction warranty
5. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.

4.5 Item 4 – 2 Door Refrigerator/1 Door Freezer (Existing Item #E3-Remains) – One (1)

4.6 Item 5 – Sheet Pan Racks (Existing Item #E4-Remains) – One Lot (1 Lot)

4.7 Item 6 – Utility Carts (Existing Item #E5-Remains) – One Lot (1 Lot)

4.8 Item 7 – Ice Maker (Existing Item #E21-Remains) – One (1)

4.9 Item 8 – Dry Storage Shelving – One Lot (1 Lot) Required

- A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF. FIVE TIER HIGH
- B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed),
 1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.

4.10 Item 9 - Spare Number

4.11 Item 10 – Lockers (Existing Item #E23-Remains) – One (1)

4.12 Item 11 - Pot/Pan Drying Rack – One (1) Required

- A. Metro
 1. 4 ea. Model MQ2430G Quick Ship - MetroMax® Q Shelf, 30"W x 24"D, removable open grid polymer shelf mats on an epoxy coated steel frame with quick adjust corner releases, (4) wedge connectors, Microban® antimicrobial product protection, 800 lb. capacity per shelf, NSF
 2. 4 ea. Model MX74UP Quick Ship - Polymer trilobal post (compatible with MetroMax® i, MetroMax® 4, MetroMax® Q), 73-3/16"H, for use with stem casters, adjusts at 1"

increments, corrosion proof all polymer construction with built in Microban® antimicrobial product protection

3. 2 ea Model 5MPX Quick Ship - Stem Caster, swivel, 5" dia., 1-1/4"W face, high modulus DONUT WHEEL tread, 300 lb. capacity, NSF (donut bumpers included) (for use with all MetroMax posts & shelves)
4. 2 ea Model 5MPBX Quick Ship - Stem Caster, brake, 5" dia., 1-1/4"W face, high modulus donut wheel tread, 300 lb. capacity, NSF (donut bumpers included) (for use with all MetroMax posts & shelves)
5. 1 ea Model MERGH24S Quick Ship - Easy-Grip Handle, 24", ergonomic design, fits 24"D mobile shelving, includes: (2) tri-lobal adapters, stainless steel, NSF (Compatible with MetroMax® i, MetroMax® Q, & MetroMax® 4).
6. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure a proper fit.

4.13 Item 12 - 3 Compartment Sink (Existing Item #E20 -Remains) – One (1)

4.14 item 13 - Hand Sink – Two (2) Required

- A. Advance Tabco Model 7-PS-62 Dimensions: 17.25(h) x 17.25(w) x 15.25(d) Hand Sink, wall mounted, 14" wide x 10" front-to-back x 5" deep bowl, Deep Drawn™ sink bowl, 20 gauge 304 stainless steel, splash mounted gooseneck faucet, knee valve, basket drain, keyhole wall mount bracket, NSF, cCSAus. Provide each with the following:
 1. 1 ea Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge
 2. On hand sink closest to dish room provide 1 ea. Model K-170 Eye Wash Attachment, attaches to standard spout, adjustable aerated outlet heads, float-off dust covers, pull knob activation, removable aerator on bottom, chrome plated forged brass body.

4.15 Item 14 – Dry Storage Shelving – One Lot (1 Lot) Required

- A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.FIVE TEIR HIGH
- B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed),
 1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.

4.16 Item 15 – Fire Suppression System - One Lot (1 Lot) Required

- A. Ansul R-102 Ansul Fire Protection System
 1. This item shall provide coverage for items 16, 17, 19, 20 & 21 Furnish a complete wet chemical fire suppression system model R102 as manufactured by "Ansul" or equal in compliance with U.L. 300 standards. The system shall include factory prepipe, all permits

- and test as required by the authority having jurisdiction.
2. Automatic actuation shall be by means of fusible with no visible conduit. System shall include an electrically actuated release mechanism.
 3. System shall be furnished and installed by an Ansul certified distributor in accordance with manufacturer's instructions and the authority having jurisdiction.
 4. Microswitches shall be furnished as part of the fire protection system for tie in of building alarm and for makeup air/fire/fuel shut down.
 5. All access openings, holes, sleeves, chases, etc., in building structure necessary to permit piping and control tubing to be run between system unit, ventilator and duct work are to be provided by the General Contractor.
 6. The Building Alarm System Contractor is to furnish a control relay to detect operation of the system by connection to the microswitches supplied. The Electrical Contractor is to furnish and install all wiring required for the system specified.
 7. All exposed piping and nozzles of fire protection system shall be chrome or Stainless steel sleeved including manual pull station piping.
 8. Whenever possible coordinate with general contractor and fire suppression supplier and architect to run pull station piping recessed in wall. This will need to be completed during framing of wall.
 9. All horizontal piping is to be done on the top of the ventilator unless otherwise specified.
 10. Verify location of remote manual pull station.
 11. "Electrical contractor/ shunt trip breaker by EC

4.17 Item 16 - Exhaust Hood w/Supply Air – One (1) Required

- A. Dimensions: As shown on Halton's Drawings# U-22-511 with a typical hanging height of 6'-8" above finished floor. Hood shall have fire cabinet mounted on right or left side, as shown on drawings. Hood controls to be remote and are to ship loose for installation in the field. FEC to coordinate location with Architect
1. Furnish and install a complete kitchen exhaust canopy with supply plenum. The hood shall be the "Capture-Jet" System #Q KVE-PSP SJ.
 2. The installation shall be in accordance with the manufacturer's recommendations and the canopy exposed areas and inner liner shall be 18-gauge stainless steel with a #4 brushed finish, double shell end walls and face construction. Single wall construction will not be permitted. Hood shall be UL Listed and labeled for "zero clearance" at the end(s) of the hood as shown on drawings when mounted against a wall. Unexposed surfaces are 18-gauge stainless steel. The installation shall be in accordance with the manufacturer's recommendations and conform to NFPA-96 guidelines and all applicable local codes. The hood height shall not exceed 24" H. The overall lengths of the hoods shall be as indicated on drawings and/or equipment schedule. Use of Capture Walls to create a seal between cooking equipment and wall shall not be used as they require cooking equipment to be located further from wall reducing isle space. Bottom edge of hood front panels to be square, chamfered front shall not be allowed as they reduce front overhang and jeopardize capture and containment over tall cooking equipment. The use of S/S end panels or the installation of a s/s rear seal installed behind the cooking equipment shall not be permitted.
 3. The hood shall be provided with a 24" wide PSP-Perforated Supply Plenum the entire

length of the hood front as shown on drawings with a white powder coat finish to match the drop ceiling tiles in the kitchen. It shall provide a laminar flow down discharge through a perforated stainless steel plenum for introduction of makeup air at low velocity in front of the hood, as shown on plans. Discharge velocity shall not exceed 135 fpm through 28% perforated panel, nor affect the hood capture and containment.

4. The KVE hood combines Capture Jet technology, T.A.B. ports and KSA grease filters.
5. Hood will include an active internal "Capture-Jet" System that will allow for Capture and Containment of thermal plume at specified air volumes. The Capture Jet air shall be pulled into a 1" air plenum with the Capture-Jet fan and discharged through Capture-Jet ports that are located along the inside front, side and bottom edge of the hood at discharge velocity of 1800 FPM. Slot type, passive devices or "Short-Cycle" discharge is not acceptable.
6. Include 12" W S/S Fire cabinet full depth of hood on the end of the hood as shown on drawings.
7. The hood shall be equipped with model KSA multi-cyclone stainless steel grease extractors. The grease extraction efficiency is 93% on particles with a diameter of 5 microns and 98% on particles with a diameter of 15 microns or larger, based upon ASTM F-2519-05 method of test. Sound levels shall be between 40 and 55 NC.
8. The air flows through the KSA extractors and the Capture Jet air chamber are to be determined through the integral T.A.B. (Testing and Balancing) ports mounted in the hood. It is the responsibility of the air balancer to adjust the exhaust volumes after installation with a Magnahelic Gauge or Shortridge Digital Anemometer and the hood TAB ports.
9. Each hood shall be equipped with Halton Culinary LED Lights (HCL). Constructed from stainless steel frame and Aluminum hosing, the light fitting comprises flush mounted broad beam spots with a diffusion angle of at least 80°. Each light is comprised of a patented mixing chamber and a specific reflector. Both shall provide a good balance between direct and diffuse light components without dazzling the staff to mitigate eye fatigue. The shielding angle shall exceed DIN 12464-1 requirement and be at least 30°. The illuminance on the working surfaces shall be 50-foot candles with a CRI Color Rendering Index greater than 80. The wattage per fixture will be 14W, and provide code required 50-foot candles
10. at the cooking surface. The LED's lifetime shall be 50,000 hours. The internal power supplies shall have at least the same lifetime. They shall enable switching on/off or dimming the light (0-100%) with one or several switches. The lights shall be supplied with vapor proof, grease proof, and heat proof UL-listed designed specifically for commercial kitchen hood application. All light fixtures shall be wired in a concealed manner to a junction box on top of the hood for connection to the remote wall mounted light switch. All wiring is in accordance with the National Electric Code (NFPA 70).
11. The Exhaust fan(s) will be controlled by the remote wall mounted fan switch panel that includes the light switch.
12. The exhaust airflow will be based on the convective heat generated by the appliances underneath each canopy. Submittal shall include convective heat calculations base on the input power of the appliance served as defined by ASTM Standards F-1704-05 Capture & Containment and F-2474-05 Heat Gain to Space. Final air volume calculations shall comply with the hood listing. The use of end panels or rear seals to

achieve required airflows, are not acceptable.

13. Performance Criterion: Other manufacturers wishing to offer an alternate to the specified manufacturer must apply for permission to do so, in writing, from the office of the specifying consultant. The consultant must receive application at least ten working days prior to the bid date. Any alternate system must meet construction and performance requirements and efficiencies as outlined in this specification. Requests for approval must include grease filtration performance data (micron size vs. extraction) for mechanical extractor and manufacturer's own exhaust airflow calculations based on convective heat load of cooking equipment beneath the hood. Efficiency comparison data to be performed in accordance with ASTM Standard F1704-96 and include results for exhaust rate for capture and containment of convective plume, Temperature rise of exhaust air and Heat Gain to the space (kBtu/h). Make up air will be calculated so that the same amount of air will be taken from the zone as is required by the specified system. An additional load cannot be placed on the kitchen HVAC system. Manufacturer must provide a written guarantee of performance, ensuring the specifying consultant that the system will perform to the consultant's satisfaction when installed and balanced according to design airflows and results of ASTM Standard F1704-96 test. (As determined by TAB ports and pressure vs. air flow curves). Consultant reserves the right to reject any system which, when installed, does not perform to ASTM Standard F1704-96 for heat gain according to the specification. Rejected system must be replaced with specified system, with all replacement costs paid by manufacturer of rejected system. Any changes in the specified sizing of power wiring or gas lines due to the use of any system other than that which is specified is the responsibility of the alternate hood manufacturer and must be coordinated by the hood manufacturer and contractors involved.
14. Supply and install S/S closure panels around perimeter of hood to finished ceiling.
15. KSA Filter Removal Tool. FEC to mount in convenient location using wall bracket included
16. Pre-pipe fire suppression system.
17. Please Note: Field verify all collar locations with structure above prior to releasing the hood for fabrication.
18. Remote control panel (verify location with Architect)

4.18 **Item 17 - Range W/Griddle (Existing item #E13 - Relocate) – One (1)**

4.19 **Item 18 - Spare Number**

4.20 **Item 19 - Tilting Kettle (Existing Item #E14 - Relocate) – One (1)**

4.21 **Item 20 - Double Deck Convection Oven (Existing item #E15 – Relocate) – One (1)**

4.22 **Item 21 - Combination Oven – One (1) Required**

- A. RATIONAL Model ICP 10-FULL E 208/240V 3 PH (LM100EE) Dimensions: 39.9(h) x 42.25(w) x 38.4(d)(CE1ERRA.0000221) iCombi Pro® 10-Full Size Combi Oven, electric, (10) 18" x 26" sheet pan or (20) 12" x 20" steam pan or (10) 2/1 GN pan capacity, (5) stainless steel grids included, intelligent cooking system with (4) assistants; iDensityControl,

iCookingSuite, iProductionManager, & iCareSystem, (6) operating modes, (5) cooking methods, (3) manual operating modes, 85° to 572°F temperature range, quick clean, care control, eco mode, 6-point core temperature probe, retractable hand shower, Ethernet interface, Wi-Fi enabled, 208/240v/60/3-ph, 37.4 kW, CE, IPX5, UL, cULus, NSF, ENERGY STAR-®. Provide with the following:

1. 1 ea. 2 years parts and labor, 5 years steam generator warranty
2. 1 ea. Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, FEC to coordinate THIS IS REQUIRED
3. 1 ea. Model 9999.2252 RCI RATIONAL Certified Installation, new certified installation for each table-top iCombi of a combi-duo, FEC to coordinate to included commission by Rational certified installer THIS IS REQUIRED MUST PROVIDE PROOF OF IN CLOSEOUT DOCUMENTS
4. 1 ea. Model 9999.2002 Pre-Installation Site Consultation, provides an installation consultation to ensure the site has proper space and connections for gas, electric, drain & water,
5. 1 ea. Model 8720.1554US (Installation Kit, for electric iCombi/SCC/CMP 102 (208/60/3 & 240/60/3); electric iCombi/SCC/CMP 202 (440/60/3)
6. 1 ea. Model 1900.1154US Water Filtration Single Cartridge System, for any iVario, single Combi model, or XS or half-size Combi-Duos, includes: (1) single head with pressure gauge, R95H filter & filter installation kit
7. 1 ea. NOTE: The RATIONAL Water Filtration Systems helps provide consistent high-quality water to your RATIONAL cooking systems. The patented carbon block technology reduces the effects of sediment, chloramines and chlorine while providing the required flow rates
8. 1 ea. Model 1900.1155US Water Filtration Cartridge, replacement or add on with additional Modular Head to Double Cartridge System, includes: (1) R95HF filter
9. 1 ea. Model 56.01.535 Active Green Cleaner Tabs, for all iCombi Pro/Classic, 150 pieces/bucket (minimum order quantity- 2 ea., unless ordered with a unit)
10. 1 ea. Model 56.00.562 Care Tabs, bucket of 150 packets for all iCombi Pro/Classic models and SelfCooking Center® units from 10/2008, with CareControl - Serial SG, SH or SI series (minimum order quantity: 2pcs, unless ordered with a unit)
11. 1 ea. Model 60.31.106 Stand III Mobile Oven Stand, 27-1/2"H, (14) supporting rails, side panels, rear panel and cover, stainless steel construction, height adjustable casters, for iCombi 6- and 10-full size Classic/Pro
12. 1 ea. Model 87.00.732US Safety-Set, Equipment placement system for all casters-mounted equipment, allows precise, consistent equipment placement for drain lines to floor sinks and under the fire suppression in ventilation systems, satisfies NFPA codes 17A (5.6.4) and 96 (12.1.2.3), includes tow (2) pieces and installation pack.
13. Rational provides for K-12 programs free of charge FEC MUST include at purchase
 - a. 5 ea. Model 6019.1250 CombiFry Basket, 1/2 GN, 12" x 10"
 - b. 5 ea. Model 9999.9999 I COMBI PRO 10 FULL-SIZE STAINLESS-STEEL GRIDS
14. 1 ea. CDF Model DTV120-SV 3/4" Inlet Drain Tempering Valve Kit with brass fittings and double check valve 120-degree F set Point. Standard volume to be used to temper water below 140 degree at less than 25 GPH.

4.23 **Item 22 - File Cabinet (Existing Item #E22 - Relocate) – One (1)**

4.24 **Item 23 - Desk (Existing Item #E21 - - Relocate – One (1)**

4.25 **Item 24 - Sandwich Prep Unit (Existing Item - Relocate)- One (1)**

4.26 **Item 25 - Mobile Slicer Stand – One (1) Required**

- A. Piper Products/Servolift Eastern Model 331-3424 Dimensions: 34(h) x 27.13(w) x 31.13(d) Slicer Stand, Mobile, open base with pan rack, stainless steel tubular base, with marine edge top, 4" casters (2 with brakes). Provide with the following:
1. 1 ea. 1-year warranty parts and labor
 2. 1 st Model -WB Wheel brakes (set of 2)

4.27 **Item 26 -Slicer - One (1) Required**

- A. Hobart Model HS9-1 Dimensions: 27.25(h) x 24.63(w) x 30.31(d) Heavy Duty Meat Slicer, automatic, 13" CleanCut™ removable knife with removal tool, anodized finish with (6) interlocks, (3) stroke lengths & (4) stroke speeds, removable meat grip assembly, removable ring guard cover, product fence, single action top mounted sharpener with Borazon™ stones, manual lift lever, 1/2 hp motor, 120v/60hz/1-ph NSF cETLus. Provide with the following:
1. 1 ea. warranty - 1-Year parts, labor & travel time during normal working hours within the USA

4.28 **Item 27 - Spare Number**

4.29 **Item 28 - Island Chef's Worktable – One (1) Required**

- A. Custom Model by Marlo size and shape as shown on drawing#23PS01 Approximately 60" X 144" X 34" high. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. 1 5/8" OD stainless legs adjustable s/s flanged feet. 16-gauge under shelf the length of the table. Under Shelf to be welded to legs 10" AFF with S/S "C" Channel bracing. (excluding sink section)
- B. Provide four (4) 20" X 20" stainless steel drawers as seen on drawing. Drawers to be double pan construction with HD S/S rollers bearing, integral pull handle, lock and cutting boards.
- C. One (1) 20" x 20" X 10" deep coved construction prep sink with twist handle waste with bracket and overflow. No under shelf under sink area.
- D. Over prep sink area provide approximately 36" single line overhead pot/pan rack. 2" x 3/16" S/S flat bar welded to 1 5/8" OD S/S Tubular sleeves. Provide (8) eight corrosion resistant s/s type pot hooks. For the remaining length of the table provide a single over shelf 12" wide X length of the table. Shelf to be constructed of a 16-gauge stainless. 2" turn up at rear, 2" down bends at sides and front. Mounted on 1 5/8" OD tubular uprights and cantilever brackets with concealed fasteners. Over shelf to accommodate microwave oven item 29.

- E. Provide two (2) doghouse GFI outlets (120/1/15AMPS) as indicated on drawings for items # 24 & 29 and two (2) GFI convenience outlets internally factory wired to junction box (UL certified) to a single point connection at a chase. Chase 18-gauge S/S chase to run from tabletop connection to floor. Chase to have (2) removable access panels to provide access for connections ID to be approximately 2" x 4" provide 4" x 6" end flanges at floor and tabletop connections. FEC to seal chase to floor. Supply with the following:
1. 1 ea. T&S Brass Model B-0221-EE Mixing Faucet, deck mount, 12" swing nozzle, 8" centers on deck faucet with 1/2" IPS EE male inlets with adjustable flange, quarter-turn Eterna cartridges with spring checks, lever handles, low lead content, ADA Compliant.
- 4.30 **Item 29 - Microwave (Existing Item - Relocate) – One (1)**
- 4.31 **Item 30 - Mixer Stand (Existing Item #E27 - Relocate) – One (1)**
- 4.32 **Item 31 - Bench Mixer (Existing Item #E8 - Relocate) – One (1)**
- 4.33 **Item 32 - Can Opener – One (1) Required**
- A. Edlund Model 270/115V Dimensions: 11.5(h) x 6.75(w) x 10(d) Can Opener, electric, for heavy volume, 2-speed motor, knife and gear assemblies that are removable for cleaning, recommended for up to 200 cans per day, cULus, CE, NSF certified, 115v/60/1-ph, 1.5 amp. Provide with the following:
1. 1 ea. 3-year limited warranty
- 4.34 **Item 33 - Food Processor (Existing Item #E6 - Relocate) – One (1)**
- 4.35 **Item 34 – Island Worktable – One (1) Required**
- A. Custom Model by Marlo size and shape as shown on drawing#23PS01 Approximately 60" X 114" X 34" high. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. 1 5/8" OD stainless legs adjustable s/s flanged feet. 16-gauge under shelf the length of the table. Under Shelf to be welded to legs 10" AFF with S/S "C" Channel bracing. (excluding sink section)
- B. Provide Four (4) 20" X 20" stainless steel drawers as seen on drawing. Drawers to be double pan construction with HD S/S rollers bearing, integral pull handle, lock and cutting boards.
- C. One (1) 20" x 20" X 10" deep coved construction prep sink with twist handle waste with bracket and overflow. No under shelf under sink area. Over prep sink area provide approximately 36" single line overhead pot/pan rack. 2" x 3/16" S/S flat bar welded to 1 5/8" OD S/S Tubular sleeves. Provide (8) eight corrosion resistant s/s type pot hooks.
- D. Provide two (2) doghouse GFI outlets (120/1/15AMPS) as indicted on drawings for items #32 & 33 and two (2) doghouse GFI convenience outlets internally factory wired to junction box (UL certified) to a single point connection at a chase. 18-gauge S/S chase to run from tabletop connection to floor. Chase to have (2) removable access panels to provide access

for connections ID to be approximately 2" x 4" provide 4" x 6" end flanges at floor and tabletop connections. FEC to seal chase to floor to be NSF & UL approved. Supply with the following:

1. 1 ea. T&S Brass Model B-0221-EE Mixing Faucet, deck mount, 12" swing nozzle, 8" centers on deck faucet with 1/2" IPS EE male inlets with adjustable flange, quarter-turn Eterna cartridges with spring checks, lever handles, low lead content, ADA Compliant

4.36 Item 35 -Clean Dish Table – One (1) Required

- A. Custom model by Marlo size and shape as shown on drawing #23PS01 Approximately 96" long X 30" Wide X 34" high 1 5/8" OD S/S legs with adjustable S/S flanged feet on front legs, S/S adjustable bullet feet on back. 16 gauge under shelf the length of table. Under shelf to welded to legs 10" AFF. 14-gauge 304 S/S top with raised rolled edges. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. 10" Back Splash at 45 degree & 3/4 turn down with enclosed back and ends Provide cut out for dish machine table limit switch provided by FEC. Finished edges at all walls.

4.37 Item 36 - Hose Reel W/Control Panel – One (!) Required

- A. T&S Brass Model B-7242-C05 Hose Reel System, enclosed, 3/8" x 50' hose with high flow blue spray valve, with ratcheting system & adjustable hose bumper, epoxy coated steel. Supply with the following:
 1. 1 ea. 1-year limited warranty
 2. 1 ea. 1-year limited warranty for hose
 3. 1 ea. 2-year limited warranty for hose reel
 4. FEC to wall mount reel so it does not interfere with dish washing operations
- B. 1 ea. Fisher Model 1801 Reel Rinse Control Unit, valves, gauges and connections are completely enclosed within a stainless-steel cabinet, dual check backflow preventer, water hammer silencer, 90° panel lock, padlock hasp & finger latch, 1/2" NPT female inlets & outlets.

4.38 Item 37–Power Dry Unit – One (1) Required

- A. San-Aire Industries Model PD-100-M Dimensions: 9.5(h) x 28(w) x 9.5(d)PowerDry™ Kitchenware Dryer, Electric, lighted on/off rocker switch, (2) 20" x 6" x 3/8" removable aluminum filter, 826 CFM blower, adjustable air distribution louver, stainless steel housing, UL, CUL, NSF. Provide with the following:
 1. 1 ea. 120v/60/1, 4.33amps, 500w, cord with NEMA 5-15P
 2. 1 ea. SMB-PD-M wall mount bracket
 3. FEC to coordinate sheet pan racks to clear dryer

4.39 Item 38 – Vent Duct Risers - Two (2) Required

- A. Custom model by Marlo size and shape as shown on drawing #23PS01 Approximately 4" x 16" with angle color for each riser 18gauge 304 stainless steel All seam to be continuously welded, ground and polished to eliminate any condensation. Vent stack shall run from vent

cowl on the dish washer to 3" AFC. To be NSF approved

4.40 Item 39 - Dish Washer – One (1) Required

- A. Hobart Model CL44EN-ADV+BUILDUP Dimensions: 68.5(h) x 44.75(w) x 31.25(d) Conveyor Dishwasher, Advansys model, single tank, (202) racks/hour, insulated hinged doors, .62 gallon/rack, stainless steel enclosure panels, microprocessor controls with low temperature & dirty water indicators, NSF Pot & Pan mode, programable de-lime notification, 30 kW stainless booster, energy recovery (DWER), automatic soil removal (ASR), drain water tempering kit, ENERGY STAR®, Free factory startup FEC to coordinate provide start up documentations at close out. Provide with the following:
1. 1 ea. warranty - 1-Year parts, labor & travel time
 2. 1 ea. Model CL44EN-ADVHTE15K Electric tank heat 15kW
 3. 1 ea. Model CL44EN-ADVERH30K 30kW electric booster
 4. 1 ea. Model CL44EN-ADVELE0AX 208v/60/3-ph (verify electric)
 5. 1 ea. Dual Point (2) service connection
 6. 1 ea. Model CL44EN-ADVHGTHTS Higher than standard
 7. 1 ea. Model CL44EN-ADVDIRVER Verify direction of operation
 8. 1 ea. Model CL44EN-ADVFEETSTD Standard feet
 9. 1 ea. NOTE: For water of 3-grains of hardness or more, Hobart suggests adding a water softener.
 10. 4 ea. Model DISHRAK-PEG20 Peg rack
 11. 4 ea. Model DISHRAK-COM20 Combination rack
 12. 4 ea. Model SHTPAN-RACK Rack, 6 sheet pan
 13. 1 ea. Model PRESREG-1/20BR 1/2" brass pressure regulator – Standard with built-in booster heater models. Regulator must be installed before the booster (built-in or remote), as the water temperature to the regulator must not exceed 140F
 14. 2 ea. Model 1/2INSHK-ABSRBR Water Shock Absorber Kit (2 required - 1 each incoming hot and cold-water lines)
 15. 1 ea. Model CLE/TBL-SWITCH Table limit switch CLE-Series

4.41 Item 40 - Scrapper/Collector – One (1) Required

- A. Salvajor Model S914 Dimensions: 35.88(h) x 24.81(w) x 22.25(d) Scrap Collector™, scrapping, pre-flushing & collecting system (widely accepted in areas where disposers are restricted), NEMA 4 HYDROLOGIC® control panel with patented operator sensor, two water saving modes (timed run & auto start/stop), safety line disconnect, LCD readout, salvage basin & silverware trap, scrap basket, 3/4 HP corrosion-resistant pump, pump intake screen, stainless steel construction, UL, CSA, CE, NSF. Provide with the following:
1. 1 ea. Collector top is to ship to the EMI for factory installation in advance of unit
 2. 1 ea. 208v/60/3-ph, 3.2 amps
 3. Factory authorized star up and demonstration is included FEC to coordinate this is REQUIRED provide proof at close out

4.42 Item 41 - Soiled Dish Table – One (1) Required

- A. Custom model by MARLO size and shape as shown on drawing #23PS01 Approximately 45"

X 87"long X 30" Wide)with a 45" wide portion of the table at the tray return) X 34" high 1 5/8" OD S/S legs with adjustable S/S flanged feet on front legs, S/S adjustable bullet feet on back 16 gauge under shelf under the pass-thru section. Under shelf to welded to legs 10" AFF. (excluding waste collector area)14-gauge 304 S/S top with raised rolled edges. Top to be constructed of a 14-gauge 304 stainless steel with S/S channel edge construction. "C" channel bracing cylindrical gussets and mastic sound deadening. Fully weld in top item # 40 (Salvajor waste collector) Install collector on table per manufactures guidelines to be NSF & UL Approved

- B. WITH PASS THROUGH OPEN ROLL DOWN DOOR 10" back splash at wall locations with a 2" off set at window Provide a step-up though ledge 16 gauge of the wall thickness and turn down Window frame to be provided and coordinated with coiling roll down door. FSC is required to provide approved roll down door shop drawing to Marlo/EMI at the time of order. Provide a s/s window frame in the coiling shutter door opening. FSE shall coordinate roll down door installation with GC.

4.43 **Item 42 - 2 Door Reach in Refrigerator - One (1) Required**

- A. Continental Refrigerator Model 2RENSA Dimensions: 82.25(h) x 57(w) x 35.38(d) Extra-Wide Refrigerator, reach-in, 57"W, two-section, self-contained refrigeration, stainless steel exterior, aluminum interior, standard depth, full-height solid doors, cylinder locks, electronic control with digital display, hi-low alarm, electric condensate evaporator, R290 hydrocarbon refrigerant, 1/3 HP, cETLus, NSF, ENERGY STAR®. Provide with the following:
1. 1 ea. Standard warranty: 6-year parts and labor; additional 1-year compressor part
 2. 1 ea. 115v/60/1-ph, 6.9 amps, cord, NEMA 5-15P, standard
 3. 1 ea. Left Door hinged on left & right door hinged on right, standard
 4. 1 ea. 5" Casters, standard
 5. 2 ea. Model 50-P008A-E Universal Pan Slide Assembly, full section universal slides for 18 x 26 or (2) 12 x 20 pans on 5" centers, bottom support, stainless steel angles (E Models only) (holds 10 pans per full section)

4.44 **Item 43 - Solid Top Unit - One (1) Required**

- A. Piper Products/Servolift Eastern Model 3-ST-MOD Per drawing # 7276 Dimensions: 36(h) x 46(w) x 28(d) Elite Utility Serving Counter, 46"L x 36"H, mobile modular design with interlocking mech., 14 gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel undershelf, 5" casters, NSF, MODIFIED TO 34"D. Provide with the following:
1. 1 ea. 1-year warranty parts and labor
 2. 1 ea 120v/60/1-ph, 9.3 amps, NEMA 5-15P
 3. 1 ea. "Petite Elite" 30" high in lieu of standard height
 4. 1 ea Model SOUT Single Outlet, 5-15R FOR ITEM 46 HATCO GRSB-36-O 120V, 1PH, 9.3 AMPS
 5. 1 ea Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
 6. 1 ea Model FLP Filler Strips, for Elite systems
 7. 1 ea Model HD-46 Hinged doors for (3) openings Elite system

8. 1 ea Model LD Locks, for doors for Elite system
9. 1 ea Model FRMAD-46 Formica laminate with doors, for Elite systems. Color selection to be Wilsonart Catalina 60 Matte finish. FEC to verify prior to ordering.
10. 1 ea Model SCB-8-46 Cutting Board for Elite system, 8", for (3) openings - 46"W, stainless
11. 1 ea Model SRTS-46 Trayslide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (3) openings - 46"W
12. 1 ea Model INSTALL PACKAGE INSTALL PACKAGE - to include cut-out in the countertop, install for the drop-in provided by FEC, electrical hook-up, reinforced top, and louvered panels if required. ***Drop-in to be provided by FEC.***
13. Item 46 Hatco GRSB-36-O to be provided by FEC and installed by Piper.
14. 1 ea Model PG MOUNT Mounting of other manufacturer's sneeze guard.
15. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG. ***
16. Item 44 Premier guard to be provided by FEC and installed by Piper.

4.45 Item 44 - Breath Protector– One (1) Required

- A. Premier Metal & Glass TM2S-A -Pre Drawing #47675 1" OD Gearless Adjustable Food Shield With Top Shelf, Rear Supports And Slanted Front Support; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Fixed); Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx. 40" CI Length; Approx. 136 Lbs. Ea. (2 End Supports) Fully Adjustable Single Tier To Protect Item 46
 1. FEC to Ship to Piper for factory installation

4.46 Item 45 - Spare Number

4.47 Item 46 - Heated Shelf – One (1) Required

- A. Hatco Model GRSB-36-O Dimensions: 2.88(h) x 37.5(w) x 31.5(d)Glo-Ray® Drop In Heated Shelf with Recessed Top, 37-1/2" x 31-1/2", 1/2" deep recessed surface area, hardcoat aluminum top, control thermostat, illuminated on/off switch & mounting bracket, NSF, CE, cUL, UL, UL EPH Classified, CSA. Provide with the following:
 1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
 2. 1 ea. 1-Yr Warranty on Blanket Heating Elements against burnout, standard
 3. 1 ea. 120v/60/1-ph, 1110 watts, 9.3 amps, NEMA 5-15P (domestic voltage), standard
 4. 1 ea. NOTE: Recommended for use in metallic countertop, verify that the material is suitable for temperatures up to 200-degree F
 5. 1 ea. Thermostat control with lighted rocker switch (available at time of purchase only), standard
 6. FEC to Ship to Piper for factory installation

4.48 Item 47 - Breath Protector – One (1) Required

- A. Premier Metal & Glass Model TMT2S-A Per Drawing #47675 1" OD Gearless Adjustable Two Tier Food Shield With Top Shelf, Rear Supports And Slanted Front Support; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Fixed); Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx.

40" CI Length; Approx. 136 Lbs. Ea. (2 End Supports) Double Tier Fully Adjustable To Protect Item 48

1. FEC to ship to Piper for factory installation

4.49 Item 48 - Frost Top Unit – One (1) Required'

- A. Hatco Model FTB-2 Dimensions: 17.25(h) x 39(w) x 28.94(d) Drop-In Frost Top, 39"L, accommodates (2) full size sheet pans, lighted on/off rocker switch, electronic adjustable temperature control can be mounted to either side of condensing unit or remotely up to 4' from unit, auto-defrost, 1" NPT drain, self-contained refrigeration, R513a, 1/4 HP, cULus, Made in USA. Provide with the following:
1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
 2. 1 ea. One-year parts & labor warranty
 3. 1 ea. 120v/60/1-ph, 300 watts, 3.8 amps, NEMA 5-15P, 1/5 HP (domestic voltage)
 4. FEC to ship to Piper for factory installation

4.50 Item 49 - Solid Top Unit – One (1) Required

- A. Piper Products/Servolift Eastern Model 4-ST-MOD Per drawing #7276 Dimensions: 36(h) x 60(w) x 28(d) Elite Utility Serving Counter, 60"L x 36"H, mobile modular design with interlocking mech., 14-gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel undershelf, 5" casters, NSF, MODIFIED TO 30"D. Provide with the following:
1. 1 ea. 1-year warranty parts and labor
 2. 1 ea. 120v/60/1-ph, 3.8 amps, NEMA 5-15P
 3. 1 ea. "Petite Elite" 30" high in lieu of standard height
 4. 1 ea. Model SOUT Single Outlet, 5-15R FOR ITEM 48 HATCO FTB-2 120V, 1PH, 3.8 AMPS
 5. 1 ea. Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
 6. 1 ea. Model FLP Filler Strips, for Elite systems
 7. 1 ea. Model HD-60 Hinged doors for (4) openings Elite system
 8. 1 ea. Model LD Locks, for doors for Elite system
 9. 1 ea. Model FRMAD-60 Formica laminate with doors, for Elite systems. Color selection to be Wilsonart Catalina 60 Matte finish. FEC to verify prior to ordering.
 10. 1 ea. Model SCB-8-60 Cutting Board for Elite system, 8", for (4) openings - 60"W, stainless
 11. 1 ea. Model SRTS-60 Trayslide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (4) openings - 60"W
 12. 1 ea. Model INSTALL PACKAGE INSTALL PACKAGE - to include cut-out in the countertop, install for the drop-in provided by FEC, electrical hook-up, reinforced top, and louvered panels if required. ***Drop-in to be provided by FEC.***
 13. Item 48 Hatco FTB-2 to be provided by FEC and installed by Piper.
 14. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.
 15. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG. ***
 16. Item 47 Premier guard to be provided by FEC and installed by Piper.

4.51 Item 50 - Tray Lowerators– Two (2) Required

- A. Piper Products/Servolift Eastern Model PT/1014MO Dimensions: 36.13(h) x 14.94(w) x 18.5(d) Mobile Tray Dispenser, solid bottom, self-leveling, single stack, holds (150) 10-3/4" x 15-1/8" trays, with corner bumpers, stainless steel all tubular frame, NSF. Provide with the following:
1. 1-year warranty parts and labor
 2. FEC to verify tray size with owner

4.52 Item 51 - Solid Top Unit - One (1) Required

- A. Piper Products/Servolift Eastern Model 6-ST Per Drawing # 7276 Dimensions: 36(h) x 88(w) x 28(d) Elite Utility Serving Counter, 88"L x 36"H, mobile modular design with interlocking mech., 14-gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel undershelf, 5" casters, NSF. Provide with the following
1. 1 ea. 1 year warranty parts and labor
 2. 1 ea. 120/208v/60/1-ph, 22.8 amps, NEMA 14-30P
 3. 1 ea. Model SOUT Single Outlet, 14-30R FOR ITEM 54 DUKE HCF-5 120/208V, 1PH, 22.8 AMPS
 4. 1 ea. Model JC Unit to include 14 gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
 5. 1 ea. Model FLP Filler Strips, for Elite systems
 6. 1 ea. Model HD-88 Hinged doors for (6) openings Elite system
 7. 1 ea. Model LD Locks, for doors for Elite system
 8. 1 ea. Model FRMAD-88 Formica laminate with doors, for Elite systems
 9. WILSONART 13092-60 CATALINA MATTE FINISH
 10. 1 ea. Model SCB-8-88 Cutting Board for Elite system, 8", for (6) openings - 88"W, stainless
 11. 1 ea. Model SRTS-88 Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (6) openings - 88"W
 12. 1 ea. Model INSTALL PACKAGE INSTALL PACKAGE - to include cut-out in the countertop, install for the drop-in provided by FEC, electrical hook-up, reinforced top, and louvered panels if required. ***Drop-in to be provided by FEC.***
 13. Item 54 Duke HCF-5 to be provided by others and installed by Piper.
 14. 1 ea. Model ME Mitered end for tray slide for Elite system
 15. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.
 16. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG. ***
 17. Item 52 Premier guard to be provided by others and installed by Piper.
 18. 1 ea. Model TURN DOWN Modified turn down with special interlocks to connect 2 different height counters.

4.53 Item 52 - Breath Protector – One (1) Required

- A. Premier Metal & Glass Model TM2S-A Per Drawing #47675- 1" OD Gearless Adjustable Food Shield With Top Shelf, Rear Supports And Slanted Front Support; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Fixed); Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx. 82" CI Length;

Approx. 192 Lbs. Ea. (2 End And 1 Center Supports) Fully Adjustable Single Tier To
Protect Item 54

4.54 Item 53 - Mobile Warming Cabinets (Existing Item #E7 -Relocate) – Two (2).

4.55 Item 54 - 5 Well Hot/Cold Unit – One (1) Required

- A. Duke Manufacturing Model HCF-5 Dimensions: 25.94(h) x 80.19(w) x 25.5(d)
Hot/Cold/Freeze Drop-In Food Well Unit, heated & refrigerated, 80" long, (5) 12" x 20"
individual pans, 300 series stainless steel top rim, 5" deep 300 series stainless steel interior
liners, steel exterior housing, individual wired remote digital controls for hot or cold operation,
air-cooled condensing unit, individual drains manifolded to a valve, 6' cord & plug NEMA #14-
30P, 208 volt, 60 hrz, 1 phase, 18 amps, UL, cULus, NSF #4 & 7. Provide with the following:
1. 1 ea. Model HCF-5-208 120/208v/60/1-ph, 17.2 amps, NEMA L14-30P
 2. FEC to ship to Piper for factory installation

4.56 Item 55 - Solid Top Unit– One (1) Required

- A. Piper Products/Servolift Eastern Model 5-ST-MOD Per drawing # 7276 Dimensions: 36(h) x
74(w) x 28(d)Elite Utility Serving Counter, 74"L x 36"H, mobile modular design with
interlocking mech., 14-gauge stainless steel top, 20 gauge stainless steel front & end panels,
18 gauge stainless steel undershelf, 5" casters, NSF, MODIFIED TO 30"D. Provide with the
following:
1. 1 ea. 1-year warranty parts and labor
 2. 1 ea. 120v/60/1-ph, 3.8 amps, NEMA 5-15P
 3. 1 ea. "Petite Elite" 30" high in lieu of standard height
 4. 1 ea. Model SOUT Single Outlet, 5-15R FOR ITEM 57 HATCO FTB-3 120V, 1PH, 3.8
AMPS
 5. 1 ea. Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep
cords for interconnected wired units (IWU) off the floor
 6. 1 ea. Model FLP Filler Strips, for Elite systems
 7. 1 ea. Model HD-74 Hinged doors for (5) openings Elite system
 8. 1 ea. Model LD Locks, for doors for Elite system
 9. 1 ea. Model FRMAD-74 Formica laminate with doors, for Elite systems. Color selection
to be Wilsonart Catalina 60 Matte finish. FEC to verify prior to ordering.
 10. 1 ea. Model ME Mitered end for tray slide for Elite system
 11. 1 ea. Model SRTS-74 Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless
steel, for (5) openings - 74"W
 12. 1 ea. Model INSTALL PACKAGE INSTALL PACKAGE - to include cut-out in the
countertop, install for the drop-in provided by FEC, electrical hook-up, reinforced top,
and louvered panels if required. ***Drop-in to be provided by FEC***
 13. Item 57 Hatco FTB-3 to be provided by FEC and installed by Piper.
 14. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.
 15. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG. ***
 16. Item 56 Premier guard to be provided by FEC and installed by Piper.

4.57 Item 56 - Breath Protector – One (1) Required

- A. Premier Metal & Glass Model TMT2S-A -Per Drawing #47675 - 1" OD Gearless Adjustable Two tier Food Shield With Top Shelf, Rear Supports And Slanted Front Support; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Fixed); Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx. 60" CI Length; Approx. 192 Lbs. Ea. (2 End And 1 Center Supports) Double Tier Fully Adjustable Breath Guard To Protect Item 57.
1. FEC to ship to Piper for factory installation

4.58 Item 57 - Frost Top Unit – One (1) Required

- A. Hatco Model FTB-3 Dimensions: 17.25(h) x 57(w) x 28.94(d) Drop-In Frost Top, 57"L, accommodates (3) full size sheet pans, lighted on/off rocker switch, electronic adjustable temperature control can be mounted to either side of condensing unit or remotely up to 4' from unit, auto-defrost, 1" NPT drain, self-contained refrigeration, R513a, 1/4 HP. cULus, Made in USA. Provide with the following:
1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
 2. 1 ea. One-year parts & labor warranty
 3. 1 ea. 120v/60/1-ph, 300 watts, 3.8 amps, NEMA 5-15P, 1/5 HP (domestic voltage) standard
 4. FEC to ship to Piper for factory installation

4.59 Item 58 - Solid Top Unit – One (1) Required.

- A. Piper Products/Servolift Eastern Model 4-ST-MOD Per drawing # 7276 Dimensions: 36(h) x 60(w) x 28(d) Elite Utility Serving Counter, 60"L x 36"H, mobile modular design with interlocking mech., 14 gauge stainless steel top, 20 gauge stainless steel front & end panels, 18 gauge stainless steel undershelf, 5" casters, NSF, MODIFIED TO 34"D. Provide with the following:
1. 1 ea. 1-year warranty parts and labor
 2. 1 ea. 120v/60/1-ph, 11.9 amps, NEMA 5-15P
 3. 1 ea. "Petite Elite" 30" high in lieu of standard height
 4. 1 ea. Model SOUT Single Outlet, 5-15P FOR ITEM 59 HATCO GRSB-48-O 120V, 1PH, 11.9 AMPS
 5. 1 ea. Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
 6. 1 ea. Model FLP Filler Strips, for Elite systems
 7. 1 ea. Model HD-60 Hinged doors for (4) openings Elite system
 8. 1 ea. Model LD Locks, for doors for Elite system
 9. 1 ea. Model FRMAD-60 Formica laminate with doors, for Elite systems. Color selection to be Wilsonart Catalina 60 Matte finish. FEC to verify prior to ordering.
 10. 1 ea. Model SRTS-60 Tray slide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (4) openings - 60"W
 11. 1 ea. Model INSTALL PACKAGE INSTALL PACKAGE - to include cut-out in the counter top, install for the drop-in provided by FEC, electrical hook-up, reinforced top, and louvered panels if required. ***Drop-in to be provided by FEC.***
 12. Item 59 Hatco GRSB-48-O to be provided by FEC and installed by Piper.

13. 1 ea. Model PG MOUNT Mounting of other manufacturer's sneeze guard.
14. ***ELECTRICAL TO EXIT OPERATOR RIGHT BACK LEG. ***
15. Item 60 Premier guard to be provided by FEC and installed by Piper.

4.60 Item 59 - Heated Shelf – One (1) Required

- A. Hatco Model GRSB-48-O Dimensions: 2.88(h) x 49.5(w) x 31.5(d) Glo-Ray® Drop In Heated Shelf with Recessed Top, 49-1/2" x 31-1/2", 1/2" deep recessed surface area, hardcoat aluminum top, control thermostat, illuminated on/off switch & mounting bracket, NSF, CE, cUL, UL, UL EPH Classified, CSA. Provide with the following:
 1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 414-671-6350
 2. 1 ea. 1-Yr Warranty on Blanket Heating Elements against burnout
 3. 1 ea. 120v/60/1-ph, 1430 watts, 11.9 amps, NEMA 5-15P (domestic voltage)
 4. 1 ea. NOTE: Recommended for use in metallic countertop, verify that the material is suitable for temperatures up to 200-degree F
 5. 1 ea. Thermostat control with lighted rocker switch (available at time of purchase only)
 6. FEC to ship to Piper for factory installation.

4.61 Item 60 - Breath Protector – One (1) Required

- A. Premier Metal & Glass Model TM2S-A – Per drawing #47675 - " OD Gearless Adjustable Food Shield With Top Shelf, Rear Supports And Slanted Front Support; 3/8" Clear Tempered Glass With Polished Edges And Radius Corners; Both End Panels Included (Fixed); Surface Mounting Option; No Heat/Light Included; Brushed Stainless Finish; Approx. 52" CI Length; Approx. 136 Lbs. Ea. (2 End Supports) Single Tier Fully Adjustable Breath Guard To Protect Item 59
 1. FEC to ship to Piper for factory installation

4.62 Item 61 - Mobile Soiled Breakdown Table – One (1) Required

- A. Custom Model by Marlo size and shape as shown on drawing # 23ps01 Approximately 30" X 96" X 34: high. Provide casters with ALL with brake, no under shelf cross braces on at customer side, provide cross bracing on ends and back center brace. Coordinate location of center brace with item 3, Side and back splash at all walls 14-gauge stainless steel top construction "C": channel bracing cylindrical gussets and mastic sound deadening. Stainless steel legs, provide (3) 12" cut out for trash receptacles (item #62) FEC to coordinate with owner provided cans item# 62. NSF

4.63 Item 62 - Garbage Cans (By Owner) – Three (3)

4.64 Item 63 - Milk Cooler (Existing Item #E33- Relocate)– One (1)

4.65 Item 64 - Ice Cream Merchandiser (Existing Item #E31 --Relocate)– One (1)

4.66 Item 65 - Cahiers Station - One (1) Required

- A. Piper Products/Servolift Eastern Model 2-CD Per Drawing # 7276 Dimensions: 36(h) x 30(w)

x 28(d) Elite Cashier's Serving Counter, 30"L x 36"H, mobile modular design with interlocking mech., 14-gauge stainless steel top with register cord hole, locking drawer, 20 gauge stainless steel front & end panels, 5" casters. Provide with the following:

1. 1 ea. 1-year warranty parts and labor
2. 1 ea Model DOUT Duplex Outlet, 120V for Elite system
3. 1 ea Model JC Unit to include 14-gauge stainless steel "J" channel cord chase to keep cords for interconnected wired units (IWU) off the floor
4. 1 ea Model TFR Tubular footrest-cashier unit, Elite systems
5. 1 ea Model FRMA-30 Formica laminate without doors, for Elite systems. Color selection to be Wilsonart Catalina 60 Matte finish. FEC to verify prior to ordering.
6. 1 ea Model SRTS-30 Trayslide for Elite system, 12" solid ribbed, heavy gauge stainless steel, for (2) openings - 30"W

4.67 **Item 66 - Cash Register (Existing Item #E30 - Relocate) – One (1)**

4.68 **Existing Equipment Removals:**

- A. It is the responsibility of this contractor to fully remove all existing foodservice equipment from the School Kitchen, this includes exhaust hoods and walk-in, and refrigeration systems as required (electric, plumbing & HVAC disconnections by related trades). Refer to 3.3 of this specification for existing equipment requirements.

4.69 **Reused Existing Equipment:**

- A. This Kitchen Equipment Contractor (KEC) shall be responsible for identifying, tagging and/or removing all existing equipment, which will be reused. Verify and coordinate specific equipment with these plans and specifications, and the Owner. This shall include items existing, and the associated work necessary, at the time of the signing of the Contract for the Foodservice Equipment section; and shall not include any item(s) added, changed, or damaged (by other than the Kitchen Equipment Contractor (KEC)) after the signing; except to the extent of work which would have been included with the original existing item(s).
- B. Remove from existing locations, clean and renovate as noted below, store and re-install existing equipment to be reused, in the new locations as shown on plans; ready for utility connections, as appropriate. Existing equipment to be reused, with utility connections, shall be removed after disconnection as noted in below paragraph.
- C. Do work in cooperation with Owner, so that normal functioning of services is minimally interrupted. Coordinate all removal and replacement scheduling with the Construction Scheduling Manager (or similar responsible party), to ensure adequate time to complete the necessary work. If adequate time to properly relocate and reset the existing items and complete all cleaning and repair will not be available, due to continuing use of the existing

item(s), or the allotted construction time; contact the Owner and obtain a written agreement as to what work is to be deleted or delayed; such as cleaning, repainting, or repairs.

- D. All surface dirt, grease, oil, food residues, ingredients, extraneous matter and other soiling materials shall be removed in order to obtain minimum acceptable sanitation and food service standards. Thorough final rinsing of all cleaning agents shall be at a minimum temperature of 180 degrees F where possible without damage to equipment or controls. Otherwise, use USDA approved cleaning agents and/or cleaning agents, which are acceptable for use with commercial food service equipment. This shall include all exterior surfaces of the existing equipment to be reused, and interior work surfaces such as inside oven compartments, fryer vats, ware washers, etc.
- E. All painted items with major paint blemishes shall be sanded, primed, and repainted to match the original color and type paint. Primer and paint shall be of a type approved for use with commercial food service equipment. All controls, lights, view windows, non-painted parts, etc. shall be protected as recommended by the Manufacturer. Minor paint blemishes shall be touched-up in a professional manner. This work shall be included in the Bid Submittal, as a separate line cost, at the end of the Bid Submittal.
- F. Replace or repair minor broken parts to produce a cleanable and functional item, where possible. Repairs and/or parts shall be for minor required items such as control knobs, handles, pilot lamps, belts, oil changes, minor adjustments and recalibrations, etc. This shall not include addition or replacement of any wearing components such as cutters, blades, etc.; or any accessory components such as mixer beaters, hooks, whips, etc., except for presently existing accessory components which are broken and nonfunctional, or as noted in the itemized specifications.

4.70 **Existing Conditions:**

- A. It is the responsibility of this contractor to fully review the existing conditions of the building and the new kitchen. This contractor shall be familiar with access to the kitchen location, including equipment access by elevators, stairwells, corridors, openings, including access around the exterior of the building for a crane or hoisting equipment (if required). It will be the responsibility of this contractor to coordinate equipment installation with the owner, CM, GC, etc....

4.71 **Plumbing of Equipment**

- A. The plumbing and food service equipment contractors are to comply with 1370-a and 1110, Subpart 67-4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York. All outlet fixtures used for drinking or cooking shall be tested by Owner

prior to being put into service. All test results in exceedance of the action level shall require the fixture to be replaced until satisfactory test results are obtained at no additional cost to Owner.”

PART 5 - DETAILS OF CONSTRUCTION

5.1 DETAIL DRAWINGS

- A. The following details are a part of these specifications and shall be referred to for additional design requirements: FS-01, FS-02, FS-03, FS-04, FS-05, FS-06, FS-07 & FS-08

END OF SECTION 11 40 00

SECTION 11 60 01
BROADCAST, THEATER AND STAGE EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Special purpose rooms including the following:
 - 1. Modular sound-isolation practice rooms.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. ASTM International (ASTM):
 - 1. ASTM A1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - 2. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 4. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 5. ASTM E 413 - Classification for Rating Sound Transmission.
- C. Builders Hardware Manufacturers Association (BHMA): ANSI/BHMA A156.9 - Cabinet Hardware.
- D. Code of Federal Regulations (CFR):
 - 1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- E. Underwriter's Laboratory (UL):
 - 1. UL 723 - Test for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Shop Drawings:
 - 1. Include fabrication and installation details. Distinguish between factory and field work.
 - 2. Include plans, elevations, sections, attachments and work by other trades.
 - 3. Indicate seismic bracing and fastening requirements as applicable.
- C. Verification Samples:
 - 1. Exposed Finishes and Finish Materials: Not less than 4 by 4 inches (102 by 102 mm), for each type, color, pattern, surface and material selected.
- D. Closeout Submittals:
 - 1. Operation and Maintenance Data: For adjusting, repairing and replacing components and accessories.
 - 2. Warranty: Submit manufacturer's warranty.
 - 3. As-Built Drawings: For completed work.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain all products from a single manufacturer through one source providing a comprehensive material and installation package:
- B. Manufacturer Qualifications: Minimum 5 years' experience in design and manufacturing of similar products on projects of similar size, scope and complexity, and with the production capacity to meet the construction and installation schedule.
- C. Electrical Components: Listed and labeled per NFPA 70, Article 100 by a testing agency acceptable to Authorities Having Jurisdiction (AHJ).
- D. Regulatory Requirements: Where components are indicated to comply with accessibility requirements, comply with the U.S. Architectural and Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities".

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original unopened containers with manufacturer's labels attached. Do not deliver material until spaces to receive them are clean, dry, and ready for their installation. Ship to jobsite only after roughing-in, painting and other finishing work has been completed, installation areas are ready to accept work.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install materials until spaces are enclosed and weather tight, wet work in spaces is complete and dry, HVAC system is operating and maintaining ambient temperature at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify field measurements as indicated on Shop Drawings. Where measurements are not possible, provide control dimensions and templates.
 - 1. Coordinate installation and location of blocking and supports as requested.
 - 2. Verify openings, clearances, storage requirements and other dimensions relevant to the installation and final application.
 - 3. Where applicable, coordinate locations of electrical junction boxes.
- C. Field Measurements: Verify field measurements as indicated on Shop Drawings. Where measurements are not possible, provide control dimensions and templates.
 - 1. Coordinate locations of electrical junction boxes.
- D. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 WARRANTY

- A. Special Warranty for Special Purpose Rooms: Manufacturer's written warranty indicating manufacturer's intent to repair or replace components of sound-isolation practice rooms that fail in materials or workmanship within 5 years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:
 - 1. Fracturing or breaking of room components, including doors, panels, or hardware, that results from normal wear and tear and normal use other than vandalism.
 - 2. Delamination or other failures of glue bond of components.
 - 3. Warping of components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.
 - 4. Failure of operating hardware.

5. Failure of acoustical gaskets and seals.
6. Failure of room to perform acoustically in accordance with manufacturer's published data.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Requests for substitutions shall be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
 1. Manufacturers seeking approval shall submit the following:
 - a. Product data, including third-party certified acoustical data and proposed graphic/drawing layout for this project.
 - b. Project references: Minimum of 5 installations not less than 3 years old, of comparable size, scope and complexity of this project, complete with owner contact information.
 - c. Sample warranty.
 2. Submit substitution request not less than required days prior to bid date.
 3. Approval shall be indicated by issuance of written Addendum.
 4. Approved manufacturers shall meet separate requirements of Submittals Article.
 5. Manufacturers' products that are either listed as pre-approved in these Specifications or who have been granted approval as an alternate must still demonstrate all of the material performance and operational characteristics required by this Section.

2.2 MODULAR SOUND-ISOLATION PRACTICE ROOMS

- A. Basis of Design: SoundLok Sound-Isolating Practice Rooms as manufactured by Wenger Corporation. Factory-fabricated, modular, sound-isolation enclosures with sound transmission characteristics meeting requirements. Enclosures shall be internally wired for power, lighting, and ventilation controls. Site-fabricated enclosures and enclosures with site-installed gaskets and sealants shall not be allowed. Modifications to room on site affect acoustical performance and laboratory test data.
 1. Rooms shall be assembled from factory-gasketed modular components that allow reconfiguration and relocation without component modification or loss of acoustical performance.
 2. Interior Room Height: 7 feet 6 inches (2260 mm).
- B. Room Variation: Sound-isolation practice rooms (upgradeable to VAE) shall be equipped with integrated and wiring, raceways, panel cutouts for speakers and microphones, all concealed within wall panels to allow room to be upgraded with the VAE technology system in the future. No external mounted wiring, raceways, speakers, or microphones allowed.
- C. Airborne Noise Reduction: Sound-isolation practice rooms with 410 cu. ft. (11.6 cu. m) interior volume, 34 percent perforated interior panels, 12 inch (304 mm) airspace between modules, mounted on concrete floor construction, tested as follows:
 1. NIC 41 from exterior to interior of module, per independent lab test.
 2. NIC 63 from interior of one module to interior of adjacent module, with 12 inches (304 mm) airspace between modules, per independent lab test.
- D. Ambient Noise at Center of sound-isolation room: Lighting and ventilating systems operating, per ANSI S 12.2: Not exceeding NC 25.
- E. Reverberation Time: Sound-Isolation Practice Rooms with 640 cu. ft. (18.12 cu. m) interior volume: in contiguous octave bands, center frequencies from 125 to 4000 Hz, per ASTM C 423: 0.45 plus or minus 0.10 seconds.

- F. Sound-Isolating Door Sound Transmission Class: With full window, per internal testing only: STC 46.
- G. Safety Glazing Products: 16 CFR 1201.
- H. Seismic Performance: Comply with ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads" based upon seismic design criteria indicated.
- I. Wall Frame: 14-gauge/0.075 inch (1.91 mm) thick steel channel with 1-1/4 inch (31.75 mm) thick factory-applied acoustical gasketing at floor slab, with 3/4 inch (19 mm) leveling adjustment.
- J. Wall Panels: 30 inches by 4 inches (762 by 102 mm) thick composite panels, consisting of an exterior face of 16-gauge/0.0598 inch (1.52 mm) sheet steel, an interior face of 22-gauge/0.0299 inch (0.76 mm) perforated or solid sheet steel, with sound-attenuation material at panels indicated as perforated.
 - 1. Acoustical Seal: Two continuous acoustical gaskets factory-mounted at panel perimeter.
 - 2. Panel Attachment: Two or more mechanical locks on each vertical edge to align and engage adjoining panel and create compression seal between panels.
 - 3. Corner Assembly: Same construction as wall panels.
 - 4. Power Panel (one per unit): Same construction as wall panels, with factory pre-wiring meeting ETL and NEC requirements, consisting of conduit, wiring, junction and electrical boxes, and airtight cover plates, and including the following:
 - a. Two duplex receptacles.
 - b. Dimmable switches, occupancy sensors and connectors for lighting control (and fans, and VAE, as required).
 - c. Three empty raceways for future Owner-installed circuitry.
- K. Ceiling Frame: Sheet steel, 16-gauge/0.053 inch (1.34 mm) thick, with clamping mechanism for compressing ceiling panel acoustical gaskets, with external support beam where required by room size.
- L. Ceiling Panels: Same construction as wall panels, 15 inches wide by 6 inches thick (381 mm wide by 152 mm thick), with the following characteristics:
 - 1. Acoustical Seal: Two continuous acoustical gaskets factory mounted at panel perimeter.
 - 2. Panel Attachment: Two mechanical locks on each vertical edge to align and engage adjoining panel and create compression seal between panels.
 - 3. Sprinkler Ceiling Panels: Where indicated, panels fabricated with predrilled holes to enable fire sprinkler system installation specified elsewhere. Furnish covers for installations not requiring sprinkler piping penetration.
 - 4. Light Panels: Provide lighting: highly efficient, 50/60Hz, 100-277 Volt AC, 40 Watt, 1'x 4' dimmable edge-lit LED flat panels. Technical information; power factor: 0.9, lifetime (L70): 50,000 hours, LED chip type: 2835, number of LEDs (per panel): 216, physical dimensions: 11.83 inches (W) x 47.63 inches (L) x 0.39 inches (H), color temperature: 5000k (standard), lumens: 4200, beam angle: 120 degrees, RA value: 80, compatible with 0-10V dimmers. Compliance and approvals: ETL, FCC, DLC QPL, IP rating: damp locations.
 - 5. Coordinate and provide openings and connections for mechanical systems.
- M. Doors: 2 inches (51 mm) thick composite panel, consisting of an exterior face of 16-gauge/0.053 inch (1.34 mm) sheet steel, an interior face of 14-gauge/0.068 inch- (1.72 mm-) sheet steel, and a core of sound-attenuation material, sound transmission class (STC) 46 (based on internal testing), size and swing as indicated on Drawings, and as follows:

1. Acoustical Seals: Magnetic seal plus compression seal at head and jambs, and adjustable sweep seal at door bottom.
 2. Hinge: Cam-type wrap around continuous barrel hinge, CR 1010 steel.
 3. Door size: 3 feet (914 mm) wide standard.
 4. Door Vision Lite: Nominal 22 by 66 inches (559 by 1676 mm), glazed with safety glass.
 5. Metal threshold: Stainless steel, 1/2 inch (12.7 mm) high.
 6. Lockset: ANSI/BHMA A156.2, Series 4000, Grade 1, cylindrical lock with lever handle, 6 pin cylinder, classroom function locking, satin nickel finish.
- N. Floor Component System: Where indicated: Finish flooring bonded to high density 1-1/8 inches (22 mm) thick particleboard, supported by steel under structure, with 1-1/2 inches (38 mm) sound-absorbing vibration isolators, supported on 6-1/4 Hz natural frequency vibration isolators with 1/4 inches (6 mm) maximum deflection under typical loading, joined by mechanical fasteners and aligned by interlocking steel support clips. Floor fabricated for installation inside finished practice room without disassembly of modules.
- O. Sound Attenuation Material: ASTM C 665, Type I, 1.5-lb/cu. ft (24 kg/cu. m).
- P. Finish for Electrical Cover Plates:
1. Light, Fan and VAE Switch (as required): As selected from full range.
 2. All other: Painted to match wall panel colors.
- Q. Finishes for Other Exposed Components: Iron phosphate pre-coat and thermo-set epoxy resin powder coat (baked) finish.
1. Colors:
 - a. Wall and ceiling panels: As selected from full range.
 - b. Floor rail and door: As selected from full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine installation areas and mounting surfaces with Installer present, for compliance with manufacturer's installation tolerances including required clearances, floor level, location of blocking and anchoring reinforcements, and other existing conditions that may affect installation or performance.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Proceed with installation only after correction of unsatisfactory conditions.

3.2 INSTALLATION OF SPECIAL PURPOSE ROOMS

- A. Install rooms under direct supervision of manufacturer. Install rooms plumb, level, and true, using integral levelers. Install in accordance with manufacturer's instructions and approved submittals.
- B. Install room components utilizing integral panel clamping mechanisms. Do not use sealants, fillers, loose insulation, or exposed fasteners.
 1. Install seismic bracing and fastening in accordance with approved shop drawings.
- C. Do not modify panels or accessories in the field. Do not fasten room frame to floor unless indicated on approved shop drawings in compliance with seismic design requirements.

- D. Adjust rooms and hardware for doors to operate smoothly without warp or bind and close with uniform compression against flanges. Adjust sweep seals.

3.3 DEMONSTRATION

- A. Train Owner's personnel to adjust, operate, and maintain equipment. Turn over keys, tools, and operation and maintenance instructions to Owner.

3.4 CLEANING AND PROTECTION

- A. Repair or replace defective work as directed by Architect upon inspection.
- B. Clean surfaces. Touch up marred finishes, or replace damaged components that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by manufacturer.
- C. Protect installed products from damage, abuse, dust, dirt, stain, or paint until completion of project. Do not permit use during construction.

END OF SECTION

SECTION 12 24 00
WINDOW SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior manual roller shades.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

1.3 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.
- C. WCMA A100.1 - Safety of Window Covering Products; 2018.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to provide rough-in of electrical wiring as required for installation of hardwired motorized shades.
- B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
- C. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- E. Selection Samples: Include fabric samples in full range of available colors and patterns.
- F. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

- G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.
- I. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- J. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum five years of documented experience with shading systems of similar size and type.
 - 1. Manufacturer's authorized representative.
- 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 MOCK-UP

- A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams and batten pockets when applicable.
 - 1. Obtain Architect's approval of light and privacy characteristics of fabric prior to fabrication.
 - 2. Full-sized mock-up may become part of the final installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.9 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: One year.
 - 2. Fabric: One year.
 - 3. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Interior Manually Operated Roller Shades:

1. Draper, Inc: www.draperinc.com/#sle.
2. MechoShade Systems LLC: www.mechoshade.com/#sle.
3. Drapery Industries, Inc: www.draperyindustries.com..
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ROLLER SHADES

A. General:

1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
2. Provide shade system that operates smoothly when shades are raised or lowered.

B. Interior Roller Shades:

1. Basis of Design: Draper, Inc;; Clutch Operated FlexShade: www.draperinc.com/#sle.
 - a. Or Approved Equal.
2. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.
 - a. Mounting: Wall mounted.
 - b. Size: As indicated on drawings.
 - c. Fabric: As indicated under Shade Fabric article.
3. Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Hardware Type: Universal brackets.
 - b. Material Type: Plated stamped steel.
4. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.
 - a. Material: Extruded aluminum or Steel, with wall thickness and material selected by manufacturer.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Capable of being removed and reinstalled without affecting roller shade limit adjustments.
5. Hembars: Designed to maintain bottom of shade straight and flat, selected from manufacturer's standard options.
 - a. Style: Closed pocket; aluminum elliptical slat inside pocket with heat-sealed ends.
6. Manual Operation:
 - a. Clutch Operator Location: Right side, unless noted otherwise.
 - b. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
 - c. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 lb minimum breaking strength. Provide upper and lower limit stops.
 - d. Shade Lift Assistance: Manufacturer's standard spring device contained in the idler end of roller tube to reduce force required to lift shades; as required based on shade weight.
 - e. Chain Retainer:
 - 1) Chain tensioning device complying with WCMA A100.1.
 - 2) Manufacturer's standard clip.
7. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to mounting end caps, without exposed fasteners; clear anodized finish.
 - b. End Cap Covers: Match fascia or headbox finish.
 - c. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.3 SHADE FABRIC

- A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Manufacturers:
 - a. Mermet Corporation; E-Screen - 3%: www.mermetusa.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Material: Vinyl coated fiberglass.
 - 3. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
 - 4. Openness Factor: 3%.
 - 5. Weight: 10.7 ounces per square yard.
 - 6. Roll Width: 78 inches.
 - 7. Color: Refer to Finish Key.

2.4 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 - 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 - 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
- C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

3.2 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.4 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.
- C. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

3.5 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.

3.6 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

3.7 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

END OF SECTION

SECTION 12 35 83
MUSIC CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Factory-fabricated musical instrument storage cabinet system.
- B. Cabinet hardware.
- C. Accessories.

1.2 RELATED REQUIREMENTS:

- A. Section 06 10 00 - Rough Carpentry: Grounds and support framing.
- B. Section 06 41 00 - Architectural Wood Casework
- C. Section 09 65 00 - Resilient Flooring: Vinyl Base.

1.3 REFERENCES

- A. American Laminators Assoc. Performance Standard ALA 1985.
- B. ANSI - BHMA Standard A156.9, Grade 1.
- C. ANSI A135.4 - Basic Hardboard.
- D. AWI (Architectural Woodwork Institute) - Quality Standards.
- E. BHMA A156.9 - Cabinet Hardware.
- F. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.

1.4 SUBMITTALS

- A. Section 01 30 00 - Administrative Requirements , for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit two, 4 x 4 inch size samples, illustrating cabinet finish.
- E. Samples: Submit two, 4 x 4 inch size samples, illustrating counter top finish and construction.
- F. Samples: Submit two samples of drawer pulls, hinges, and other accessories, illustrating hardware finish.
- G. Product Data: Submit applicable reference standards, performance data and application recommendations and limitations..

1.5 WARRANTY

- A. Provide manufacturer's written warranty that products not in accordance with requirements of Contract Documents within three years after date of Substantial Completion shall be corrected

promptly after receipt of written notice from Owner. Warranty is to include labor and material costs.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Pack and ship to avoid damage according to manufacturer's recommendations:
 - 1. Finish and assemble components in factory before shipment.
 - 2. Ship components in individual, sealed, labeled cartons.
 - 3. Deliver components to room designated for installation.
- B. Store products in heated indoor storage near point of installation. Retain protective packaging until installing.

1.7 ENVIRONMENTAL REQUIREMENTS:

- A. Do not install cabinets until all mortar, wet and dust producing work is completed.

1.8 FIELD MEASUREMENTS

- A. Obtain required field measurements from the Contractor and indicate on Shop Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Wenger Corporation.
 - 2. Substitutions: Section 01 60 00 - Substitution Requirements.

2.2 MATERIALS

- A. Basis of Design: UltraStor Storage (Acousti-Cabinets) Cabinets as manufactured by Wenger Corporation. Modular instrument storage casework with integral bases, adjustable levelers, and through-bolted fastening, enabling owner reconfiguration of unit layout.
 - 1. Acoustically enhanced instrument storage casework finished with interior lining of sound-absorbent material providing sound absorption and noise reduction properties.
 - 2. Sound Absorption Average: Minimum SAA of 0.80, based upon sound absorption coefficient for twelve one-third octave bands from 200 to 2500 Hz, inclusive, with a minimum Noise Reduction Coefficient (NRC) of 0.75, per ASTM C 423 and ASTM E 795.
 - 3. Acoustical Performance: Comply with manufacturer's published sound absorption data.
 - 4. Wave grille doors in 5/16 inch (24 mm) and 1/4 inch (6.4 mm) diameter designed to reduce vibration. Bright basic steel wire, 5/16 and 3/16 inch (7.9 and 4.8 mm) diameter, or 5/16 and 1/4 inch (7.9 and 6.3 mm) diameter for AcoustiCabinets, with full 360 degree welds at T-joints.
 - 5. Adjustable shelf system integrated into cabinet walls allowing shelf placement at increments common to musical instruments. No loose parts or tools required. Shelf system to include a latch to prevent unintended shelf movement.
- B. Storage Casework Component Load Capacities:
 - 1. Storage Casework Wire-Grille Door Hinge: Each weld capable of resisting 400 lbf (1779 N) pull test without visible damage or permanent deformation.
 - 2. Storage Casework Full Grille Door Hinge: Full length door capable of supporting 315 lbs (143 kg). Through open and close cycle without permanent damage.

3. Robe and Uniform Storage Casework Garment Hanger Rods: Capable of supporting vertical load applied uniformly along width of unit of 200 lbf (890 N).
- C. Cabinet Wall Panels: 3/4 inch thick industrial (cabinet) grade particle board, minimum 48 pcf with thermoset polyester laminate on both sides for balanced construction.
 1. Color: as selected by Architect
- D. Cabinet Shelving:
 1. Cabinets up to 27 inches wide: One-piece high molecular blow-molded polyethylene with 1-3/8 inch radius from edge. Mount to cabinet walls with one-piece molded ST nylon clip. Shelf is to be removable.
 2. Cabinets over 27 inches wide: One-piece high molecular formed polyethylene with radius front edge and 3/16" wall thickness. Ribbed for structural integrity. Supported by four structural tubular members 1 1/2" x 1" x 16 ga. wall thickness with 14 gage welded end plates.
- E. Doors: Metal grille doors
- F. Edging: Heat bonded 3mm beveled PVC edge-banding.
 1. Color: as selected by Architect
- G. Finish Hardware:
 1. Joinery Hardware: two inch, 1/4-20 panel connectors with 15mm head diameter, and steel thread inserts.
 - a. Finish: Powder paint coating: As selected from full range.
- H. Cabinet Back Panel:
 1. Standard cabinet back to be 1/4" thick prefinished hardboard perforated with sound absorbing insulation backing.
 - a. Color: As selected from full range.

2.3 FABRICATION

- A. Fabricate and package all components in the factory and ship fully assembled to job site.

2.4 ACCESSORIES

- A. Vertical Closure Kit: Provide visual closure between wall and cabinet. Constructed of .750 inch thick thermoset composite wood to match cabinet side panels.
 1. Color: as selected by Architect
- B. Top Back Filler Kit: Provide visual closure between back wall and top panel of cabinet. Constructed of .750 inch thick thermoset composite wood to match cabinet top panels.
 1. Color: as selected by Architect
- C. Finished Back Panel: Provide panel to attach to cabinet back that is exposed. Constructed of .500 inch thick thermoset composite wood to match cabinet.
 1. Color: as selected by Architect

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Field verify and coordinate blocking and support framing. Required for anchorage of casework.

- C. Field verify and coordinate location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Set and secure casework in place; rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- H. Provide and install all trim and filler panels required to fill in all gaps between casework and adjacent wall. Provide a complete seamless installation.
 - 1. Trim and filler panels to match material and finish of cabinets. Filler panels shall be of equivalent length at each side of each run of casework

3.3 ADJUSTING

- A. Section 01 7000 - General Installation Requirements: Adjust installed work. Test installed work for rigidity and ability to support loads.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Section 01 7000 - Contract Closeout: Cleaning installed work.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.
- B. Wall-hung counters and vanity tops.
- C. Solid surface window sills.

1.2 RELATED REQUIREMENTS

- A. Section 06 41 00 - Architectural Wood Casework.
- B. Section 08 51 13 - Aluminum Windows: Solid surface sills.
- C. Section 22 40 00 - Plumbing Fixtures: Sinks.

1.3 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2016.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).
- F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).
- G. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- I. PS 1 - Structural Plywood; 2009.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- G. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- H. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; www.naturalstoneinstitute.org/#sle.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- C. Quality Certification:
 - 1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
 - 2. Provide designated labels on shop drawings as required by certification program.
 - 3. Provide designated labels on installed products as required by certification program.
 - 4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.6 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.

1.7 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

2.1 COUNTERTOPS

ITEM AD2-1 Refer to Section 12 36 00 - Countertops
AMEND subparagraph 2.1, A, 1 to read: "1. Flat Sheet Thickness: 3/4" min. Color/pattern, as selected by Architect from manufacturer's full range. Provide solid surface countertops at all new scheduled base (B) cabinets, unless noted otherwise. Provide solid surface sills as indicated on drawings."

- A. Solid Surfacing Countertops and Sills: Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Flat Sheet Thickness: 1/2 inch, 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) Dupont: www.corian.com/#sle.
 - 2) Formica Corporation: www.formica.com/#sle.
 - 3) Wilsonart: www.wilsonart.com/#sle.

- 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. Countertops shall be conventionally fabricated and self-edge banded with backsplash at cabinetry.
 4. Sills shall be solid 1/2 inch solid surface material and fabricated as scheduled in drawings.
 5. Other Components Thickness: 1/2 inch, minimum.
 6. Exposed Edge Treatment: Built up to minimum 1-1/2 inch thick; square edge; use marine edge at sinks.
 7. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 8. Fabricate in accordance with manufacturer's standard requirements.
- B. Stainless Steel Countertops: ASTM A666, Type 304, stainless steel sheet; 14 gage, .0781 inch nominal sheet thickness.
1. Finish: 4B satin brushed finish.
 2. Edge and Backsplash Sink Details: As indicated on drawings.
 3. Exposed Edge Shape: Straight turndown with return; 1-1/2 inch high face, 1/2 inch return to face of case; reinforced with hardwood or steel.
 4. Back and End Splashes: Same material; welded 1/4 inch radius coved joint to countertop; square top edge with 1 inch wide top surface and minimum 1/2 inch turndown.
 5. Splash Dimensions: 4 inch high by 1 inch thick, unless otherwise indicated.
 6. Coordinate with plumbing specifications for installation of stainless steel sinks, faucets, and plumbing accessories.

2.2 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.
- C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- D. Joint Sealant: Mildew-resistant silicone sealant, white.

2.3 ACCESSORIES

- A. Steel Fixed Countertop Support Brackets:
 1. Material: Steel; ASTM A36/A36M.
 2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
 3. Color: Black.
 4. Products:
 - a. Top-Mounted: Standard Bracket.
 - b. Face Mounted: Front Mounting Bracket.
 5. Manufacturer:
 - a. Centerline Brackets: www.countertopbracket.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Aluminum Countertop Support Brackets.
 1. Material: 6063-T6 extruded aluminum, Tig welded along both 45° mitered sides and across the back. All sharp edges ground and deburred.
 - a. Pre-drilled 5/16 inch holes for 1/4 inch fasteners.
 2. Finish: Mill aluminum.
 3. Provide flexible rubber U-channel at all brackets.

4. Products:
 - a. Up to 30 inch deep counters: EH-1824; 2x3x3/16 inch T; capacity 450 lbs. per.
 - b. Up to 24 inch deep counters: EH-1818; 2x2x1/4 inch T; capacity 450 lbs. per.
 - c. Up to 18 inch deep counters: EH-1212; 2x2x1/4 inch T; capacity 450 lbs. per.
5. Manufacturer:
 - a. Rakks Brackets: www.rakks.com.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 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 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, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
- D. Stainless Steel: Fabricate tops up to 144 inches long in one piece including nosings and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
 1. Weld joints; grind smooth and polish to match.
 2. Provide stainless steel hat channel stiffeners, welded or soldered to underside, where indicated on drawings.
 3. Provide wall clips for support of back/end splash turndowns.
 4. Sound Deadening: Apply water resistant, fire resistant sound deadening mastic to entire bottom surface.
 5. Coordinate with plumbing specifications for installation of stainless steel sinks, faucets, and plumbing accessories.
- E. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.1 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.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Provide solid wood blocking at all walls and countertops connected to brackets.

3.3 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach stainless steel countertops using stainless steel fasteners and clips.
- C. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

- A. Clean countertops surfaces thoroughly.

3.6 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 13 34 23
PRE-FABRICATED SITE STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pre-Fabricated Site Structures.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-In-Place Concrete: Concrete footings and slabs.
- B. Division 31 - Earthwork: Site preparation, grading, excavating.

1.3 SYSTEM DESCRIPTION

- A. Pre-fabricated package shall include structural steel framing members, T&G wood roof deck, wood fascia, roofing, and fasteners, selected from manufacturer's full range.

1.4 REFERENCE STANDARDS

- A. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- B. AITC 108 - Standard For Heavy Timber Construction; 1993.
- C. ANSI A190.1 - Standard for Wood Products - Structural Glued Laminated Timber; 2017.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.
- F. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- G. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2018.
- H. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.
- I. 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; 2018.
- J. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- L. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- M. SSPC-SP 10 - Near-White Blast Cleaning; 2007.

1.5 SUBMITTALS

- A. Product Data: Provide manufacturer's standard cut sheets, or fabricator's data sheets for each component required for the erection and completion of the structure indicated.
- B. Shop Drawings: Minimum 5 sets of shop drawings, showing all details of construction, including foundation sizes, reinforcement, and locations.
 - 1. Shop drawings and calculations shall be signed and sealed by professional engineer licensed in the State of New York.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- D. Selection Samples: For each finish product specified, color charts representing manufacturer's full range of available colors.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State of New York.
- B. The pre-engineered building manufacturer's professional engineer shall design the structure to satisfy the following codes:
 - 1. 2020 Building Code of New York State; ICC (IBC).
 - 2. "Minimum Design Loads for Buildings and Other Structures" ASCE 7, American Society of Civil Engineers.
 - 3. For additional information on design loading see structural general notes drawing.
- C. Manufacturer Qualifications: Company experienced in design and manufacture of shelters of the type specified, and having the following:
 - 1. Minimum five years of experience in design and fabrication of pre-fabricated steel shelters.
 - 2. Three references of similar shelters completed within the past year.
 - 3. Fabricator membership in American Institute of Steel Construction (AISC), requiring quality control documentation and procedures. Provide current AISC shop certification in accordance with AISC 201.
 - 4. Fabricator membership in AITC and APA/EWS. Members shall be marked (in an unseen finish product location) with an AITC or APA/EWS Quality Mark. Additionally, a Certificate of Conformance shall be provided, indicating conformance with ANSI A190.1 and AITC 108.
 - 5. All welding to be performed to AWS standards by AWS certified welders. Provide welding certification upon request.
- D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and dated no more than 12 months before start of scheduled welding work.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Package factory-finished steel components in foam, cardboard, and stretch wrap to protect the finish during transit.
- B. Wood roof deck shall be load wrapped and banded together in bundles.
- C. Shipped knocked down for minimal shipping charges.
- D. Deliver products to project site in manufacturer's protective packaging.

- E. Follow shelter manufacturer's recommendations and instructions, including those printed on the shop drawings. To minimize damage during unloading, use only padded forks or non-marring slings.
- F. Prefinished materials not being immediately installed must be protected from sunlight.
- G. Store products in manufacturer's unopened packaging well off the ground and covered out of weather until ready for installation.

1.8 WARRANTY

- A. Provide minimum five year frame warranty against manufacturer defects.
- B. Provide roofing manufacturer's limited warranty.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

- A. RCP Shelters, Inc: www.rcpshelters.com.
- B. Or Approved Equal.
- C. Substitutions: Products other than specified must request and receive approval in writing by addendum at least ten (10) days prior to the bid date.

2.2 APPLICATIONS

- A. Structure #1, Pavilion:
 - 1. Model: TSLW-G282808-TG-M.
 - a. Shape: Rectangular.
 - b. Dimensions: 28 x 28
 - c. Roof Style: Gable.
 - d. Roof Pitch: As indicated on drawings.
 - e. Eave Height: As indicated on drawings.
 - f. Support framing: Tubular Steel
 - g. Roof framing: Glue Lam structural wood
 - h. Roof deck: Structural wood, tongue and groove.
 - i. Roof: Composite slate shingles, By DaVinci Roofscapes- Multi-Width Slate <https://www.davinciroofscapes.com/products/slate/multi-width-slate>. Refer to Division 07.
 - j. Stone and cast stone details at piers. Refer to Division 04.

2.3 COMPONENTS

- A. Structural Framing: fabricated for field assembly using bolted connections with no welding required or permitted; cold-formed shapes prohibited.
 - 1. Columns & Beams: ASTM A500/A500M Grade C structural steel tube. The following shapes are prohibited: I-beams, wide-flange beams, C-channels, Z-shapes.
 - 2. Plates: ASTM A572/A572M Grade 50.
 - 3. Compression Ring: steel plate, ASTM A572/A572M Grade 50.
 - 4. Fasteners
 - a. Bolts: ASTM F3125/F3125M high strength bolts.
 - b. Nuts: ASTM A563 high strength nuts.
 - 1) All bolts shall be hidden, concealed inside the steel tubes.

5. Column Anchors: ASTM F1554 Grade 36, provided by Contractor or Owner, attached to top of foundation, recessed below slab on grade.
6. Finish: Powder Coat
 - a. Pre-blast inspection to catch and remove oil, grease, and other coatings impeding contaminants.
 - b. Steel grit blasted to near white condition in accordance with SSPC-SP 10, removing all oil residue, mil scale, weld spatter, and slag.
 - c. Five stage phosphate wash (includes detergent, phosphate, rust protectant sealant).
 - d. Epoxy powder coat primer.
 - e. Double topcoat TGIC polyester powder coat; color to be selected from manufacturer's standard color chart by Owner.
 - f. Primer plus finish coats shall be 7-12 mils thick.
 - g. All materials inspected to meet 100% coating, proper cure, film thickness, and impact resistance.
 - h. Wet-coat alternatives shall not be acceptable.
- B. Glued Laminated Wood
 1. Species: Southern Yellow Pine.
 2. Appearance Grade: Architectural.
 3. Lamination thickness: 2 inch, nominal.
 4. Adhesive: Resorcinol.
 5. Stress Combination: 24F-V3.
 6. Size: Per engineered drawings.
- C. Structural Wood Deck
 1. Species: #1 grade Southern Yellow Pine, kiln dried.
 2. Treatment: none.
 3. Size: nominal 2 x 8 inches.
 4. Pattern: center matched, tongue and groove, with veed edges 1 side (EV1S).
- D. Fascia
 1. Species: C or Better Clear Alaskan Yellow Cedar.
 2. Size: nominal 2 x 6 inches.
- E. Composite Slate Roof System:
 1. BOD: Davinci Roof Scapes, Multi-Width Slate
<https://www.davinciroofscapes.com/products/slate/multi-width-slate/>
 2. Color: Aberdeen to match existing.
 3. Provide all accessories and complete system details for 30 year warranty.
 4. Provide underlayment per manufacturers requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that site earthwork has been performed as required for satisfactory installation.

3.2 PREPARATION

- A. Install footings and column anchors of size, design, and location as specified by shelter manufacturer on approved shop drawings.

3.3 INSTALLATION

- A. Perform installation in accordance with applicable Federal, State, and local building and safety codes.

- B. Structural special inspections, if required, are to be arranged and paid for by the Owner.
- C. Install shelter in accordance with manufacturer's approved shop drawing and good construction practices.
- D. Install slab in accordance with shelter manufacturer's shop drawings. Slab perimeter dimensions as indicated on drawings.

3.4 CLEANING AND PROTECTION

- A. Clean installed work to like-new condition.
- B. Protect installed products until completion of project.
- C. Touch-up, repair, or replace damaged finishes before Substantial Completion. Touch up paint provided by manufacturer.

END OF SECTION

CONTRACT DOCUMENTS

VOLUME II

for

Capital Improvements Project – Phase 2
Pocantico Hills Central School District
Sleepy Hollow, NY

Central School SED #: 66-08-02-04-0-001-040
Pavilion SED #: 66-08-02-04-7-007-001

SED Submission: November 14, 2023

Issued for Bid: June 24, 2024

HUNT 3288-008

SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe markers.
- E. Ceiling tacks.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 23 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Schedules:
 - 1. Submit plumbing component identification schedule listing equipment, piping, and valves.
 - 2. Detail proposed component identification data in terms of of wording, symbols, letter size, and color coding to be applied to corresponding product.
 - 3. Valve Data Format: Include id-number, location, function, and model number.
- C. Operation and Maintenance, O&M, Manual Data: Record actual locations of tagged valves, and provide laminated valve chart which includes valve tag numbers, location and function in chart form for placement into Operations and Maintenance Manual.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

- A. Nameplates:
 - 1. Heat exchangers, water heaters, and other heat transfer products.
- B. Tags:
 - 1. Piping: 3/4 inch diameter and smaller.
 - 2. Manual operated and automated control valves.
 - 3. Instrumentation, relays, gauges, and other related control equipment products.
 - 4. Ceiling tacks placed on lay-in ceiling surface to reference plumbing components.
- C. Stencil:
 - 1. Piping: 3/4 inch diameter and higher.
 - 2. Heat exchangers, water heaters, and other heat transfer products.

- D. Pipe Markers: 3/4 inch diameter and higher.

2.2 NAMEPLATES

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Laminated piece with up to three lines of text.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/4 inch.
 - 3. Background Color: Black.

2.3 STENCILS (CONCEALED PIPING)

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Stencil Paint: As specified in Section 09 91 23, semi-gloss enamel, colors complying with ASME A13.1.

2.4 PIPE MARKERS (EXPOSED PIPING)

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Comply with ASME A13.1.
- C. Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
- D. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- E. Identification Scheme, ASME A13.1:
 - 1. Primary: External Pipe Diameter, Uninsulated or Insulated.
 - 2. Secondary: Color scheme per fluid service.
 - a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

2.5 CEILING TACKS

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Steel with 3/4 inch diameter color coded head.
- C. Color code as follows:
 - 1. Plumbing Valves: Green.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive identification products.
- B. Prepare surfaces for stencil painting, see Section 09 91 23.

3.2 INSTALLATION

- A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags in clear view and align with axis of piping
- C. Identify water heaters, pumps, tanks, and water treatment devices with plastic nameplates. Identify in-line pumps and other small devices with tags.
- D. Apply stencil painted identification in compliance with Section 09 91 23 requirements. Identify unit with assigned id-number and area being served using pipe marking rules.
- E. Install plastic pipe markers in accordance with manufacturer's instructions.
 - 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. Locate ceiling tacks to locate valves above lay-in panel ceilings. Locate in corner of panel closest to equipment.
- G. Identify concealed piping, with stenciled painting. Identify exposed piping with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. 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.
- H. Identify valves in main and branch piping with tags.

END OF SECTION

SECTION 22 07 19
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Expanded polystyrene insulation.
- B. Flexible elastomeric cellular insulation.
- C. Glass fiber insulation.
- D. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 09 91 23 - Interior Painting: Painting insulation jacket.
- C. Section 22 10 05 - Plumbing Piping and Specialties: Placement of hangers and hanger inserts.
- D. Section 22 05 53 - Identification for Plumbing Piping and Equipment.

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 2013).
- C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).
- D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- E. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017.
- F. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- G. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.
- H. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).
- I. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.
- J. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2019a.
- K. ASTM C610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation; 2017.

- L. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber; 2014.
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- N. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

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.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain ambient conditions required by manufacturers of each product.
- C. 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 INSULATION

- A. Manufacturers:
 - 1. Armstrong

- 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: 0.1 percent by volume.
- C. Vapor Retarder Jacket: ASTM C1136 Flexible, Low Permeance Vapor Retarders for Thermal Insulation, Type II. Facing: 1 inch galvanized steel hexagonal wire mesh stitched on one face of insulation.
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.
- E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

2.3 EXPANDED POLYSTYRENE INSULATION

- A. Manufacturers:
 - 1. Armstrong.
 - 2. Certainteed Company.
 - 3. Manville Products
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation: ASTM C578; rigid closed cell.
 - 1. K Value: 0.23 at 75 degrees F.
 - 2. Maximum Service Temperature: 165 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
 - 4. Maximum Water Vapor Permeance: 5.0 perm inch.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
 - 1. Armstrong
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.

2.5 JACKETING AND ACCESSORIES

- A. PVC Plastic Pipe Jacket.
 - 1. Manufacturers:
 - a. Armstrong.
 - b. Owens Corning.
 - c. Knauf.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Maximum Service Temperature: 450 degrees F.
 - b. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - c. Thickness: 15 mil.
 - d. Connections: Brush on welding adhesive.
 - 3. Covering Adhesive Mastic: Compatible with insulation.
 - 4. Insulation covering cold water systems shall contain integral vapor retarder system for moisture removal and mold prevention.
- B. Aluminum Jacket:
 - 1. Thickness: 0.020 inch sheet.
 - 2. Finish: Embossed.
 - 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. 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 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 penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

- 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. 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.
- M. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.
- N. Provide insulation to storm piping in its entirety from roof drain, entire length of horizontal storm piping run to main vertical drop.

3.3 SCHEDULES

- A. Plumbing Systems:
 - 1. All sizes of Domestic Cold water, 1/2 inch to 1-1/4 inch Hot Water, 1/2 inch to 1-1/4 inch Hot Water Recirculation and 1/2 inch to 1-1/4 inch Tempered Water Piping:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1 inch.
 - b. Cellular Glass Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1 inch.
 - c. Expanded Polystyrene Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1 inch.
 - d. Cellular Foam Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1 inch.
 - 2. 1-1/2 inch and Larger Domestic Hot Water, Hot Water Recirculation and Tempered Water Piping:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1-1/2 inch.
 - b. Cellular Glass Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1-1/2 inch.
 - c. Expanded Polystyrene Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1-1/2 inch.
 - d. Cellular Foam Insulation:
 - 1) Pipe Size Range: As Noted.
 - 2) Thickness: 1-1/2 inch.
 - 3. Roof Drain Bodies:
 - a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
 - b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
 - c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.
 - 4. Exposed Roof Drainage Above Grade
 - a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
 - b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
 - c. Cellular Glass Insulation with full PVC jacket. All pipe sizes, 1 inch thick.
 - 5. Concealed Roof Drainage

- a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
 - b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
 - c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.
6. Roof Drainage Run Horizontal at Roof Level:
- a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
 - b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
 - c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.
7. Plumbing Vents Within 10 Feet of the Exterior:
- a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
 - b. Elastomeric Cellular Foam Insulation all pipe sizes, 1 inch thick.
 - c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.
- B. Plumbing Systems:
- 1. Domestic Hot Water Storage Tanks:
 - a. Cellular Glass Insulation: 2 inches thick.
 - 2. Domestic Cold Water Storage Tanks:
 - a. Cellular Glass Insulation: 2 inches thick.
 - 3. Piping Exposed to Freezing with Heat Tracing: All pipe sizes, 1 inch thick.

END OF SECTION

SECTION 22 10 05
PLUMBING PIPING AND SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary waste piping, buried within 5 feet of building.
- B. Sanitary waste piping, above grade.
- C. Domestic water piping, buried within 5 feet of building.
- D. Domestic water piping, above grade.
- E. Pipe, pipe fittings, valves, connections and specialties for:
 - 1. Sanitary sewer systems.
 - 2. Domestic water systems.
 - 3. Storm water systems.
 - 4. Pipe flanges, unions, and couplings.
 - 5. Pipe hangers and supports.
 - 6. Pipe sleeve-seal systems.
 - 7. Ball valves.
 - 8. Butterfly valves.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
- C. Section 22 07 19 - Plumbing Piping Insulation.
- D. Section 31 23 16 - Excavation.
- E. Section 31 23 23 - Fill.

1.3 REFERENCE STANDARDS

- A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems; 2015.
- B. ANSI Z223.1 - National Fuel Gas Code; 2016.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV; 2016.
- G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
- H. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV; 2017.
- I. ASME B31.9 - Building Services Piping; 2017.

- J. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2019.
- K. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.
- L. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems; 2009.
- M. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- N. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2017.
- O. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2019.
- P. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- Q. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2015a.
- R. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2011.
- S. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2011.
- T. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.
- U. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.
- V. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV); 2013.
- W. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- X. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.
- Y. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2014.
- Z. ASTM D2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter; 2012a.
- AA. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012 (Reapproved 2018).
- AB. ASTM D2609 - Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe; 2015.
- AC. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- AD. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- AE. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2016.
- AF. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe; 2014.

- AG. ASTM F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings; 2016.
- AH. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2010.
- AI. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2017.
- AJ. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2017, with Errata (2018).
- AK. AWWA C651 - Disinfecting Water Mains; 2014.
- AL. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; 2017.
- AM. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2017 (Revised 2018).
- AN. 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; 2012 (Revised 2018).
- AO. ICC (IFGC) - International Fuel Gas Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- AP. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- AQ. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- AR. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.
- AS. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.
- AT. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- AU. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends; 2018.
- AV. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; 2011.
- AW. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.
- AX. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends; 2011.
- AY. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
- AZ. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- BA. NSF 372 - Drinking Water System Components - Lead Content; 2016.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, hangers, supports and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Project Record Documents: Record actual locations of valves.
- D. Hangers and Supports: Submit manufacturers catalog information including load capacity.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.

2. Valve Repacking Kits: One for each type and size of valve.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Perform Work in accordance with standards of the State of New York.
- C. Valves: Manufacturer's name and pressure rating marked on valve body.
- D. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.
- E. Welder Qualifications: Certified in accordance with ASME BPVC-IX.
- F. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable code for installation of backflow prevention devices.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.8 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

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.
- B. PVC Pipe: ASTM D2665 or ASTM D3034.
 1. Fittings: PVC.
 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE 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, Type L.
 1. Fittings: ASME B16.29, wrought copper, or ASME B16.23, solvent.
 2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.
- C. PVC Pipe - (Not For Use in Return Air Plenums or Exposed in Places of Assembly.): ASTM D2665.
 1. Fittings: PVC.
 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Copper Pipe: ASTM B42, hard drawn, 2-1/2 inches and smaller.
 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
 2. Joints: ASTM B32, alloy Sn95 solder.
- B. Ductile Iron Pipe: AWWA C151/A21.51, 3 inches and larger.
 1. Fittings: AWWA C110, ductile iron, standard thickness. Cement Mortar lining in conformance with AWWA C-104.
 2. Joints: AWWA C111/A21.11, styrene butadiene rubber (SBR) or vulcanized SBR gasket with 3/4 inch diameter rods.
 3. Jackets: AWWA C105 polyethylene jacket.
- C. PEX Pipe: Polyethylene cross-linked for Potable water (non-oxygen barrier). Color coded: Blue for cold domestic water and Red for hot domestic water. Complies with ASTM F876, F877, F1807, F2159, 2023, CSA B137.5.
 1. Fittings: PEX designed for use with Potable water piping.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tubing for pipe 2 1/2 inches and smaller: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H)
 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 2. Joints: ASTM B 32, alloy Sn95 solder. Lead free.
- B. Copper Tubing for pipe 3 inches and larger: ASTM B88, Type L (B), hard drawn, rolled grooved ends
 1. Fittings: ASTM B584 bronze sand castings, grooved ends.
 2. Joints: Grooved mechanical couplings meeting ASTM F1476.
 - a. Housing Clamps: ASTM A395/A395M and ASTM A536 ductile iron, enamel coated, compatible with copper tubing sizes, to engage and lock designed to permit some angular deflection, contraction, and expansion.
 - b. Gasket: Elastomer composition for operating temperature range from -30 degrees F to 180 degrees F.
 - c. Accessories: Stainless steel bolts, nuts, and washers.
 3. Mechanically pressed fitting are allowed for this application.

2.6 STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Cast Iron Pipe: ASTM A74 service weight, bell and spigot ends.
 1. Fittings: Cast iron, ASTM A74.
 2. Joint Seals: ASTM C 564 neoprene gaskets.
- B. PVC Pipe: ASTM D2665 or ASTM D3034, polyvinyl chloride (PVC) material.
 1. Fittings: PVC, ASTM D2665 or ASTM D3034.
 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

- C. PVC Pipe: ASTM D2665, ASTM D3034, or ASTM F679, polyvinyl chloride (PVC) material.
 - 1. Fittings: PVC, ASTM D2665, ASTM D3034, or ASTM F679.
 - 2. Joints: Push-on, using ASTM F477 elastomeric gaskets.

2.7 STORM DRAINAGE PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron, CISPI 301.
 - 2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.
- B. PVC Pipe (Not For Use in Return Air Plenums or Exposed in Places of Assembly.): ASTM D2665 or ASTM D3034.
 - 1. Fittings: ASTM D2665 or ASTM D3034, PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.8 FLUE AND COMBUSTION AIR PIPING

- A. CPVC Pipe: ULC S636 compliant, chlorinated polyvinyl chloride (CPVC-FGV) material.
 - 1. Fittings: ULC S636 compliant.
 - 2. Joints: ULC S636 compliant.
 - 3. All ULC S636 compliant pipes, fitting and cements to be supplied from same manufacturer.

2.9 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 2 inches and Under:
 - 1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
 - 2. PVC Piping: PVC
 - 3. CPVC Piping: PVC
- B. Flanges for Pipe Size Over 2 inches:
 - 1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
 - 2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
 - 3. PVC Piping: PVC
 - 4. CPVC Piping: PVC
 - 5. Gaskets: 1/16 inch thick preformed neoprene gaskets

2.10 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. 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.
- B. Plumbing Piping - Drain, Waste, and Vent:
 - 1. Conform to ASME B31.9.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 - 3. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 - 4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 - 5. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
 - 6. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.
 - 7. Vertical Support: Steel riser clamp.

8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- C. Plumbing Piping - Water:
1. Conform to ASME B31.9.
 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 3. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 4. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
 5. Hangers for Hot Pipe Sizes 6 inch and Larger: Adjustable steel yoke, cast iron pipe roll, double hanger.
 6. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
 7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded supports or spacers and hanger rods, cast iron roll.
 8. Wall Support for Pipe Sizes Up to 3 inch: Cast iron hook.
 9. Wall Support for Pipe Sizes 4 inch and Larger: Welded steel bracket and wrought steel clamp.
 10. Wall Support for Hot Pipe Sizes 6 inch and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
 11. Vertical Support: Steel riser clamp.
 12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 13. Floor Support for Hot Pipe Sizes to 4 inch: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
 14. Floor Support for Hot Pipe Sizes 6 inch and Larger: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
 15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- D. 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.
 3. Concrete Screw Type Anchors: Comply with ICC-ES AC193.
 4. Masonry Screw Type Anchors: Comply with ICC-ES AC106.
 5. Concrete Adhesive Type Anchors: Comply with ICC-ES AC308.
- E. INSERTS
1. 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.
- F. FLASHING
1. Metal Flashing: 26 gage thick galvanized steel.
 2. Metal Counterflashing: 22 gage thick galvanized steel.
 3. Lead Flashing:
 - a. Waterproofing: 5 lb./sq. ft sheet lead.
 - b. Soundproofing: 1 lb./sq. ft sheet lead.
 4. Flexible Flashing: 47 mil thick sheet compatible with roofing.
 5. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.
- G. SLEEVES
1. Sleeves for Pipes through Non-fire Rated Floors: 18 gage thick galvanized steel.
 2. Sleeves for Pipes through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
 3. Sealant: refer to Section 07 90 00.
- H. MECHANICAL SLEEVE SEALS

1. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

I. FORMED STEEL CHANNEL

1. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

J. FIRESTOPPING

1. Refer to Specification Section 07 84 00.

2.11 PIPE SLEEVE-SEAL SYSTEMS

A. Manufacturers:

1. The Metraflex Company: www.metroflex.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Modular Mechanical Seals:

1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
3. Size and select seal component materials in accordance to service requirements.
4. Glass reinforced plastic pressure end plates.

2.12 BALL VALVES

A. Manufacturers:

1. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle, solder or threaded ends with union. Lead free.

2.13 PLUG VALVES

- A. Construction 2-1/2 Inches and Larger: MSS SP-78, 175 psi CWP, cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

2.14 HORIZONTAL SWING CHECK VALVES

A. Up to 2 Inches:

1. MSS SP-80, 150, bronze body and cap, bronze swing disc with rubber seat, solder or threaded ends. Lead free.

2.15 SPRING LOADED CHECK VALVES

A. Up to 2 inches:

1. MSS SP 80, Class 250, bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, threaded ends. Lead free.

B. 2-1/2 inches and Larger:

- C. MSS SP 71, Class 125, wafer style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

2.16 PRESSURE GAUGES

- A. Gauge: ASME B40.1, UL 393 with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
 - 1. Case: Steel
 - 2. Bourdon Tube: Type 316 stainless steel.
 - 3. Dial Size: 3-1/2 inch diameter.
 - 4. Mid-Scale Accuracy: One percent.
 - 5. Scale: Psi.

2.17 PRESSURE GAUGE TAPS

- A. Needle Valve: Brass, 1/4 inch NPT for minimum 300 psi.
- B. Ball Valve: Brass, 1/4 inch NPT for 250 psi.
- C. Pulsation Damper: Pressure snubber, brass with 1/4 inch NPT connections.

2.18 STEM TYPE THERMOMETERS

- A. Thermometer: ASTM E1, adjustable angle, red appearing indicator, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
 - 1. Size: 9 inch scale.
 - 2. Window: Clear Lexan.
 - 3. Stem: Brass, 3/4 inch NPT, 3-1/2 inch long.
 - 4. Accuracy: 2 percent.
 - 5. Calibration: Degrees F.
 - 6. Indicator shall be non-mercury.

2.19 WATER METER

- A. Provide Lead Free water meter and remote reader as recommended by water service provider. Meter to register flow in Gallons. Plumbing Contractor to install meter and reader. Install meter in accordance with AWWA M6, with isolating valves on inlet and outlet.
- B. Obtain meter from water service provider. If not possible, obtain approval of proposed meter from Director of Utility of Water Service Provider prior to water meter purchase.

2.20 WATER HAMMER ARRESTOR -LEAD FREE

- A. Stainless steel bellow type, complies with and sized in accordance with PDI WH-201.
- B. Pre-charged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

2.21 THERMOSTATIC MIXING VALVE

- A. Valve: Chrome plated cast brass body, stainless steel or nickel plated bellows, integral temperature adjustment.
- B. Accessories:
 - 1. Check valve on inlets.
 - 2. Volume control shut-off valve on outlet.
 - 3. Stem thermometer on outlet.
 - 4. Strainer stop checks on inlets.
- C. Cabinet: 16 gage enameled steel, for surface mounting with keyed lock.

2.22 FLOOR DRAIN / FLOOR SINK

- A. Floor Drain, FD-1: ASME A112.21.1; cast iron two piece body with double drainage flange, weep holes, 1/2 inch trap primer connection, reversible clamping collar, and round adjustable nickel-bronze strainer.
- B. Floor Sink, FS-1: 12 inch x 12 inch x 6 inch floor receptor, full nickel-bronze grate, enamel interior and top, interior bottom dome strainer and 1/2 inch trap primer connection.
- C. Floor Drain / Floor Sink Trap Primer Valve: ASSE 1018, corrosion resistant brass, piston operated, no springs or diaphragms, adjustable in line pressure, 1/2 inch inlet and outlet openings.

2.23 CLEANOUTS

- A. Cleanout, Interior Unfinished Inline Accessible Area, CO-1: cast iron body ferrule type with ABS countersunk plug.
- B. Wall Cleanout, Interior Finished Wall Area, WCO-1: cast iron body with lacquered ABS tapered threaded plug and round stainless steel wall access cover with securing screw.

2.24 GREASE SEPARATOR

- A. Construction:
 - 1. Material: Epoxy coated fabricated steel.
 - 2. Fully recessed with cover flush with finished floor
- B. Accessories: Flow control fittings, cover design with quick removal for cleaning purpose.
- C. Unit Rating: 25 gpm flow and 50 lb. grease capacity.

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. Protect open ends with temporary plugs or caps.
- 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. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.

- 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.
- H. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
- I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.
- J. Provide support for utility meters in accordance with requirements of utility companies.
- K. Excavate in accordance with Section 31 23 16.
- L. Backfill in accordance with Section 31 23 23.
- M. Trench - Provide 3 inches of sand for bedding material at trench bottom to provide uniform bedding for piping. Level bedding materials and install pipe on prepared bedding. Encase installed piping with 6 inches of pea gravel. Provide fill material to trench and compact to 90 percent maximum density. Route pipe in straight line.
- N. Install bell and spigot pipe with bell end upstream.
- O. Install water piping to ASME B31.9.
- P. 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.
- Q. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- R. Sleeve pipes passing through partitions, walls, and floors.
- S. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- T. PVC piping is not allowed to be installed in places of assembly, plenum spaces, exit discharge corridors or stairs. Use cast iron or copper piping in these locations.
- U. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.
- V. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to fixtures to prevent hammer or install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or 3/4 inch minimum, and minimum 18 inches long.
- W. 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.
- X. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9.
 - 2. Support horizontal piping as indicated.
 - 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 inch 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.
 9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
 10. Provide hangers adjacent to motor-driven equipment with vibration isolation; see Section 22 05 48.
 11. Support cast iron drainage piping at every joint.
- Y. 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.
- Z. Equipment Bases and Supports
1. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment. Refer to Section 03 30 00.
 2. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
 3. Construct supports of steel members or formed steel channel. Brace and fasten with flanges bolted to structure.
 4. Provide rigid anchors for pipes after vibration isolation components are installed. Refer to Section 22 05 48.
- AA. Flashing
1. Provide flexible flashing and metal counterflashing where piping penetrates weather or waterproofed walls, floors, and roofs.
 2. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked 1 inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal.
 3. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.
 4. Seal floor, shower, and mop sink drains watertight to adjacent materials.
 5. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.
- AB. Sleeves
1. Set sleeves in position in forms. Provide reinforcing around sleeves.
 2. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
 3. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.
 4. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fire stopping, insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
 5. Install chrome plated steel escutcheons at finished surfaces.

3.4 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install globe valves for throttling, bypass, or manual flow control services.

3.5 TOLERANCES

- A. Sanitary Drainage Piping: Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum on mains 4 inches and larger. Install branch mains smaller than 4 inch with 1/4 inch per foot minimum.
- B. Storm Drainage Piping: Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect water distribution system.
- B. Final water samples shall be sent to a State Department of Health approved testing lab in the State of New York and sample test results shall be submitted to A/E of record.
- C. Prior to starting work, verify system is complete, flushed, and clean.
- D. 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).
- E. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.
- F. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- G. Maintain disinfectant in system for 24 hours.
- H. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- I. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- J. 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.

3.7 SERVICE CONNECTIONS

- A. Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.
- B. Test sanitary waste, vent piping and storm drainage system in accordance with Plumbing Code of the State of New York.
- C. Test backflow prevention device in accordance with ASSE 5013, by State certified backflow prevention device tester.
 - 1. Provide test results and Certification of tester.
- D. Test domestic water piping system in accordance with Plumbing Code of the State of New York.

- E. Provide new gas piping into building. Building gas service distribution piping to have pressure of [1/2] psi.
- F. Test 1/2 psi gas piping system at 10 psi for one hour in accordance with Fuel Gas Code of the State of New York and New York State SED Manual of Planning Standards.

3.8 SCHEDULES

- A. Pipe Hanger Spacing:
 - 1. Metal Piping:
 - a. Pipe Size: 1/2 inch to 1-1/4 inch:
 - 1) Maximum Hanger Spacing: 6.5 ft.
 - 2) Hanger Rod Diameter: 3/8 inches.
 - b. Pipe Size: 1-1/2 inch to 2 inch:
 - 1) Maximum Hanger Spacing: 10 ft.
 - 2) Hanger Rod Diameter: 3/8 inch.
 - c. Pipe Size: 2-1/2 inch to 3 inch:
 - 1) Maximum Hanger Spacing: 10 ft.
 - 2) Hanger Rod Diameter: 1/2 inch.
 - d. Pipe Size: 4 inch to 6 inch:
 - 1) Maximum Hanger Spacing: 10 ft.
 - 2) Hanger Rod Diameter: 5/8 inch.
 - 2. Cast Iron (All Sizes) pipe length less than 10':
 - a. Maximum hanger Spacing: 5 ft.
 - b. Hanger rod diameter: 5/8 inch
 - 3. Cast Iron (All Sizes) with 10 foot length of pipe
 - a. Maximum hanger Spacing: 10 ft.
 - b. Hanger rod diameter: 5/8 inch
 - 4. CPVC, 1 inch and smaller
 - a. Maximum hanger Spacing: 3 ft.
 - b. Hanger rod diameter: 1/2 inch
 - 5. CPVC, 1-1/4 inches and larger
 - a. Maximum hanger Spacing: 4 ft.
 - b. Hanger rod diameter: 1/2 inch
 - 6. Copper Tube, 1-1/4 inches and smaller
 - a. Maximum hanger Spacing: 6 ft.
 - b. Hanger rod diameter: 1/2 inch
 - 7. Copper Tube, 1-1/2 inches and larger
 - a. Maximum hanger Spacing: 10 ft.
 - b. Hanger rod diameter: 1/2 inch
 - 8. PVC (All Sizes)
 - a. Maximum hanger Spacing: 4 ft.
 - b. Hanger rod diameter: 3/8 inch

END OF SECTION

SECTION 22 30 00
PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial electric water heaters.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. 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.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data:
 - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
 - 2. Indicate pump type, capacity, power requirements.
 - 3. Provide electrical characteristics and connection requirements.
- C. Shop Drawings:
 - 1. Indicate heat exchanger dimensions, size of tappings, and performance data.
 - 2. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.
- D. Project Record Documents: Record actual locations of components.
- E. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.
- B. Accept water heaters on site in original labeled cartons. Inspect for damage.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Provide five year manufacturer warranty for domestic water heaters.
- C. Provide [5] year manufacturer warranty for electric tankless domestic water heaters.

PART 2 PRODUCTS

2.1 WATER HEATERS

- A. Commercial Electric Water Heaters:
 - 1. Manufacturers:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Type: Factory-assembled and wired, electric, vertical storage.
 - 3. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
 - 4. Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 75 W/sq in.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.
- B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.
- C. Domestic Water Heater:
 - 1. Install water heater on concrete housekeeping pad, minimum 3-1/2 inches high and 6 inches larger than water heater on each side. Refer to Section 03 30 00.
 - 2. Maintain manufacturer's recommended clearances around and over water heaters.
 - 3. Connect natural gas piping in accordance with NFPA 54.
 - 4. Connect natural gas piping to water heater, full size of water heater gas train inlet. Arrange piping with clearances for burner removal and service.
 - 5. Connect domestic hot water piping to outlet connection and connect domestic hot water recirculation piping to domestic cold water piping. Connect cold water piping to inlet connections.
 - 6. Install the following piping accessories.
 - a. On supply:
 - 1) Thermometer well and thermometer.
 - 2) Strainer.
 - 3) Pressure gage.
 - 4) Shutoff valve.
 - b. On return:
 - 1) Thermometer well and thermometer.
 - 2) Pressure gage.
 - 3) Shutoff valve.
 - c. Install the following piping accessories on natural gas piping connections. Refer to Section 22 10 05.
 - 1) Strainer.
 - 2) Pressure gage.
 - 3) Shutoff valve.
 - 4) Pressure reducing valve.
 - 7. Install discharge piping from relief valves and drain valves to nearest floor drain.

8. Install circulator and diaphragm expansion tank on water heater.
 9. Install water heater trim and accessories furnished loose for field mounting.
 10. Install electrical devices furnished loose for field mounting.
 11. Install control wiring between water heater control panel and field mounted control devices.
 12. Connect CPVC flue to water heater outlet, full size of outlet.
 13. Install Work in accordance with applicable Plumbing Code of the State of New York.
- D. Domestic Water Heat Exchangers:
1. Install domestic water heat exchangers with clearance for tube bundle removal without disturbing other installed equipment or piping.
 2. Pipe relief valves and drains to nearest floor drain.
- E. Domestic Water Storage Tanks:
1. Provide steel pipe support, independent of building structural framing members.
 2. Clean and flush prior to delivery to site. Seal until pipe connections are made.
- F. Domestic Water Softeners
1. Coordinate with plumbing piping and electrical Work to achieve operating system.
 2. Install piping accessories, as noted below but not limited to, on water conditioning equipment for 140 degree domestic hot water piping per manufacturer's recommendation.
 - a. On inlet:
 - 1) Shut-off valve.
 - b. On outlet:
 - 1) Shut-off valve.
 3. Install drain piping from tanks to nearest floor drain.
 4. Install water softener on concrete housekeeping pad, minimum 3-1/2 inches high and 6 inches larger than water softener equipment on each side. Refer to Section 03 30 00.

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush valve water closets.
- B. Lavatories.
- C. Sinks.
- D. Under-lavatory pipe supply covers.

1.2 RELATED REQUIREMENTS

- A. Section 22 10 05 - Plumbing Piping and Specialties.
- B. Section 22 30 00 - Plumbing Equipment.
- C. Section 26 05 83 - 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. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2013.
- C. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- D. ASME A112.18.1 - Plumbing Supply Fittings; 2018.
- E. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2017).
- F. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018.
- G. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2017.
- H. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2017.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- J. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- K. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- L. NSF 372 - Drinking Water System Components - Lead Content; 2016.
- M. ARI 1010 - Self-Contained, Mechanically Refrigerated Drinking-Water Coolers

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

- C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.
 - 2. Flush Valve Service Kits: One for 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.

1.6 REGULATORY REQUIREMENTS

- A. Plumbing piping, joints, faucets, etc. must comply with the requirements, and bear the label indicating the materials comply with the definition of "lead free" requirement of the Environmental Protection Agency "Reduction of Lead in Drinking Water Act".
- B. Lead Water Testing: Lead water testing shall be conducted at all Lavatories, Sinks and Drinking Fountains in accordance with Public Health Law section 1370-a and 1110, Subpart 67-4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York and the Environmental Protection Agency 3T's for Reducing Lead in Drinking Water.
- C. School District reserves the right to accept or not accept installation unless results are not greater than the Department Of Health action level.

1.7 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.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide standard manufacturer warranty for Plumbing Fixtures.

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.

2.2 MANUFACTURERS:

- A. Refer to Plumbing Fixture Schedule on drawing for Manufacturer, Model, Trim and Remarks.

2.3 FLUSH VALVE WATER CLOSETS

- A. Water Closet Bowl (WC-1): ASME A112.19.2M; ADA compliant, wall mount, siphon jet, vitreous china closet bowl with elongated rim, 1-1/2 inch top spud and 1.28 gallon flush volume.
- B. Flush Valve, Electric Powered Sensor Operated (WC-1): ADA compliant, exposed chrome plated diaphragm type with solenoid operator with one wall cover plate. Adaptive infrared sensor and true mechanical over-ride button, escutcheon, seat bumper, integral screwdriver stop, vacuum breaker and 1.28 gallon flush volume for use with 1-1/2 inch top spud.
 - 1. Electrical requirements:
 - a. Refer to Plumbing Fixture Schedule on drawing.
- C. Toilet Seats:
 - 1. Manufacturers:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Elongated solid white plastic, open front without cover, self-sustaining hinge, brass bolts.
 - 3. Elongated solid white seat and hinges, open front without cover, scalloped handhold for use with child floor mounted water closet.
- D. Water Closet Carriers:
 - 1. Manufacturers:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. ASME A112.6.1M; floor mounted, adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor attachment, threaded fixture studs with nuts and washers. For handicap and non-handicap wall mount water closets.
- E. Water Closet Accessories:
 - 1. Toilet mounting flange, bowl ring, mounting hardware, bolt caps. For handicap and non-handicap floor mounted water closets.

2.4 WALL HUNG URINALS

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Urinal, (UR-1): ASME A112.19.2; ADA compliant, wall mount, washout, vitreous china urinal with shields, integral trap, elongated 14 inch rim from finished wall, 3/4 inch top spud, steel supporting hanger and 0.50 gallon flush volume.
- C. Flush Valve, Electric Powered Sensor Operated (UR-1): ADA compliant, exposed chrome plated diaphragm type with solenoid operator with one wall cover plate. Adaptive infrared sensor, true mechanical over-ride button, escutcheon, integral screwdriver stop, vacuum breaker and 0.50 gallon flush volume for use with 3/4 inch top spud.
 - 1. Electrical requirements:
 - a. Refer to Plumbing Fixture Schedule on drawing.
- D. Urinal Carriers:
 - 1. Manufacturers:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor attachment, threaded fixture studs for fixture hanger, bearing studs. For handicap and non-handicap urinals.

2.5 LAVATORIES

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Lavatory, Vitreous China Wall Mount Basin (LAV-1): ASME A112.19.2; ADA compliant, vitreous china wall mount, 20 x 18 inch minimum, with 4 inch high back, single hole faucet mount drilling, D-shaped basin with splash lip, front overflow and grid drain. For handicap and non-handicap lavatories. Provide offset grid drain and pipe covers for handicap lavatory.
- C. Electric Powered Sensor Faucet: ADA compliant, low lead content, tempered water connection, chrome finish, maximum 0.50 gpm flow of 60 psig, 4 inch cover plate, transformer (hard wired) and lead-free thermostatic mixing valve.
 - 1. Electrical requirements:
 - a. Refer to Plumbing Fixture Schedule on drawing.
- D. Wall Mounted Carrier: ASME A112.6.1; Cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, concealed arm supports, bearing plate and studs. For handicap and non-handicap lavatories.

2.6 SINKS

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Undermount-Installed Single Compartment Bowl:
 - 1. Undercoated with side and bottom sound deadening pads.
- C. Single Compartment Bowl: ASME A112.19.3; 19 x 21 x 5-1/2 inch outside dimensions, 18 gage thick, Type 304 stainless steel. Self-rimming and undercoated, with 1-1/2 inch stainless steel offset grid drain and tailpiece and ledge back drilled for trim.
 - 1. Trim: Deck mounted low lead content mixing faucet, 11-5/8 inch high spout with 2.20 gpm aerator, chrome plated finish with single lever handle.
 - 2. Accessories: Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon, screwdriver stop and rigid supplies.
- D. Single Compartment Bowl: ASME A112.19.3; 19 x 20 x 5-1/2 inch outside dimensions, 18 gage thick, Type 304 stainless steel. Self-rimming and undercoated, with 1-1/2 inch stainless steel grid drain and tailpiece and ledge back drilled for trim.
 - 1. Trim: Deck mounted low lead content mixing faucet, 13-1/8 inch high spout with 2.20 gpm aerator, chrome plated finish with 4 inch wristblade handles.
 - 2. Accessories: Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon, screwdriver stop and rigid supplies.

2.7 UNDER-LAVATORY PIPE SUPPLY COVERS

- A. Manufacturers:
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. General:
 - 1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
 - 2. Construction: 1/8 inch PVC with antimicrobial, antifungal and UV resistant properties.
 - a. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
 - b. Comply with ICC A117.1.

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 to 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.

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 23 05 17
SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe sleeves.
- B. Pipe-sleeve seals.

1.2 RELATED REQUIREMENTS

- A. Section 23 05 53 - Identification for HVAC Piping and Equipment: Piping identification.
- B. Section 23 07 19 - 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); 2016.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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 01 60 00 - Product Requirements, for additional provisions.

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 this section.
 - 1. Minimum three years experience.
- 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.

1.6 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. Manufacturers:
 - 1. Flexicraft Industries; Pipe Wall Sleeve: www.flexicraft.com/#sle.
- B. Vertical Piping:
 - 1. Sleeve Length: 1 inch above finished floor.
 - 2. Provide sealant for watertight joint.
- C. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- D. 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.
- E. 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.
- F. 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.
- G. 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 in compliance with ASTM E814 in accordance with Section 07 84 00 to prevent the spread of fire, smoke, and gases.

2.2 PIPE-SLEEVE SEALS

- A. Manufacturers:
 - 1. Flexicraft Industries; PipeSeal: www.flexicraft.com/#sle.
- B. Modular Mechanical Sleeve-Seal:
 - 1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
 - 2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
 - 3. Size and select seal component materials in accordance with service requirements.
 - 4. Glass-reinforced plastic pressure end plates.
- C. Sealing Compounds:
 - 1. Provide packing and sealing compound to fill pipe to sleeve thickness.
 - 2. Combined packing and seal compound is to match partition fire-resistance hourly rating.
- D. Pipe Sleeve Material:
 - 1. Bearing Walls: Steel, cast iron, or terra-cotta pipe.
 - 2. Masonry Structures: Sheet metal or fiber.
- E. Wall Sleeve: PVC material with waterstop collar, and nailer end-caps.

- F. Pipeline-Casing Seals:
 - 1. End Seals: 1/8 inch, pull-on type, rubber or synthetic rubber based.

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. Manufactured 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 water-tight seal.
 - 6. Install in accordance with manufacturer's recommendations.
- F. 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

SECTION 23 05 29
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment components.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.

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 B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.

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 03 30 00.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

1.6 QUALITY ASSURANCE

- A. Comply with applicable building code.

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. 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. 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. Prefabricated Trapeze-Framed Metal Strut Systems:
 - 1. Strut Channel or Bracket Material:
 - 2. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.
- C. Hanger Rods:
 - 1. Threaded zinc-plated steel unless otherwise indicated.
- D. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

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. 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. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- G. Remove temporary supports.

END OF SECTION

SECTION 23 05 48
VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vibration-isolated equipment support bases.
- B. Vibration isolators.
- C. Seismic restraint systems.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

1.3 DEFINITIONS

- A. HVAC Component: Where referenced in this section in regards to seismic controls, applies to any portion of the HVAC system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g., ductwork, piping).

1.4 REFERENCE STANDARDS

- A. ASHRAE Std 68 - Laboratory Method of Testing to Determine the Sound Power in a Duct; 1997.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment 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. 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 03 30 00.

1.6 PERFORMANCE REQUIREMENTS

- A. Provide vibration isolation on motor driven equipment over 0.5 hp, plus connected piping and ductwork.
- B. Provide minimum static deflection of isolators for equipment as follows:
 - 1. Basement, Under 20 hp
 - a. 400 - 600 rpm: 1 inch
 - b. 600 - 800 rpm: 0.5 inch
 - c. 800 - 900 rpm: 0.2 inch

- d. 1100 - 1500 rpm: 0.14 inch
- e. Over 1500 rpm: 0.1 inch
- 2. Basement, Over 20 hp
 - a. 400 - 600 rpm: 2 inch
 - b. 600 - 800 rpm: 1 inch
 - c. 800 - 900 rpm: 0.5 inch
 - d. 1100 - 1500 rpm: 0.2 inch
 - e. Over 1500 rpm: 0.15 inch
- 3. Upper Floors, Normal
 - a. 400 - 600 rpm: 3.5 inch
 - b. 600 - 800 rpm: 2 inch
 - c. 800 - 900 rpm: 1 inch
 - d. 1100 - 1500 rpm: 0.5 inch
 - e. Over 1500 rpm: 0.2 inch
- C. Maintain sound level of spaces at levels not to exceed those listed below by utilizing acoustical devices.
- D. Maintain rooms at following maximum sound levels, in Room Criteria (RC) as defined by ASHRAE Handbook., HVAC Applications
 - 1. Halls, corridors, lobbies: 40
 - a. Service/support areas: 45
 - 2. Offices
 - a. Executive: 30
 - b. Conference rooms: 25
 - c. Private: 35
 - d. Public circulation: 40
 - 3. Schools
 - a. Lecture and classrooms: 30
 - 4. Libraries: 30
 - 5. Auditoriums and Theaters
 - a. Theater: 20 25
 - b. Stage house: 20 25

1.7 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Design Documents: Prepare and submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, details, and calculations.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
 - 1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification methods for spring element load capacities.
 - 2. Seismic Controls: Include seismic load capacities.
- D. Shop Drawings - Vibration Isolation Systems:
 - 1. Include dimensioned plan views and sections indicating proposed arrangement of vibration isolators; indicate equipment weights and static deflections.
 - 2. Vibration-Isolated Equipment Support Bases: Include base weights, including concrete fill where applicable; indicate equipment mounting provisions.
- E. Manufacturers detailed field testing and inspection procedures.

1.8 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer's Certificate: Certify isolators meet or exceed specified requirements.

1.9 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of hangers including attachment points.

1.10 QUALITY ASSURANCE

- A. Perform Work in accordance with AMCA 300 standards and recommendations of ASHRAE Std 68.
- B. Maintain one copy of each document on site.

1.11 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

1.12 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.13 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 PRODUCTS

2.1 VIBRATION ISOLATORS

- A. General Requirements:
 - 1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.

2.2 VIBRATION ISOLATORS

- A. Open Spring Isolators:
 - 1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
 - 2. Spring Mounts: Provide with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
 - 3. Sound Pads: Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.
 - 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- B. Restrained Open Spring Isolators:

1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
 2. Spring Mounts: Provide with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
 3. Sound Pads: Size for minimum deflection of 0.05 inch; meet requirements for neoprene pad isolators.
 4. Restraint: Provide heavy mounting frame and limit stops.
 5. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- C. Closed Spring Isolators:
1. Type : Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
 2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
 3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance.
 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- D. Restrained Closed Spring Isolators:
1. Type : Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
 2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
 3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance and limit stops.
 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- E. Spring Hangers:
1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
 2. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators.
 3. Misalignment: Capable of 20 degree hanger rod misalignment.
 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- F. Neoprene Pad Isolators:
1. Rubber or neoprene waffle pads.
 - a. Hardness: 30 durometer.
 - b. Thickness: Minimum 1/2 inch.
 - c. Maximum Loading: 50 psi.
 - d. Rib Height: Maximum 0.7 times width.
- G. Rubber Mount or Hanger: Molded rubber designed for 0.4 inch deflection with threaded insert.
- H. Glass Fiber Pads: Neoprene jacketed pre-compressed molded glass fiber.
- I. Seismic Snubbers:
1. Type: Non-directional and double acting unit consisting of interlocking steel members restrained by neoprene elements.
 2. Elements: Replaceable neoprene, minimum of 0.75 inch thick with minimum 1/8 inch air gap.

3. Capacity: 4 times load assigned to mount groupings at 0.4 inch deflection.
4. Attachment Points and Fasteners: Capable of withstanding 3 times rated load capacity of seismic snubber.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that mounting surfaces are ready to receive vibration isolation and/or seismic control components and associated attachments.
- 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. Secure fasteners according to manufacturer's recommended torque settings.
- D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect vibration isolation and/or seismic control components for damage and defects.
- C. Provide manufacturer representative or authorized technician services to assist with inspection and testing of vibration isolation systems and seismic controls. Submit a detailed copy of manufacturer recommended inspection, testing, and field report procedures.
- D. Correct deficiencies and replace damaged or defective vibration isolation and/or seismic control components.

END OF SECTION

SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Ceiling tacks.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 23 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

- A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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; include valve tag numbers.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Air Terminal Units: Tags.
- C. Automatic Controls: Tags. Key to control schematic.
- D. Control Panels: Nameplates.
- E. Dampers: Ceiling tacks, where located above lay-in ceiling.

- F. Ductwork: Stencilled painting.
- G. Major Control Components: Nameplates.
- H. Piping: Tags.
- I. Small-sized Equipment: Tags.
- J. Tanks: Nameplates.
- K. Thermostats: Nameplates.
- L. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.2 NAMEPLATES

- A. Manufacturers:
 - 1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com/#sle.
 - 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
 - 4. Letter Color: White.
 - 5. Letter Height: 1/2 inch.
 - 6. Background Color: Black.

2.3 TAGS

- A. Manufacturers:
 - 1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
 - 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 3. Substitutions: See Section 01 60 00 - 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. 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 of applied tags and locations in plastic laminated frame.

2.4 STENCILS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com/#sle.
 - 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Stencils: With clean cut symbols and letters of following size:
 - 1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.
 - 2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
 - 3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
 - 4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.
 - 5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
 - 6. Ductwork and Equipment: 2-1/2 inch high letters.

- C. Stencil Paint: As specified in Section 09 91 23, semi-gloss enamel, colors complying with ASME A13.1.

2.5 CEILING TACKS

- A. Description: Steel with 3/4 inch diameter color coded head.
- B. Color code as follows:
 - 1. HVAC Equipment: Yellow.
 - 2. Fire Dampers and Smoke Dampers: Red.
 - 3. Heating/Cooling Valves: Blue.
 - 4. Plumbing valves: Green

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 09 91 23 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. Apply stencil painting in accordance with Section 09 91 23.
- D. Install plastic pipe markers in accordance with manufacturer's instructions.
- E. Install ductwork with stencilled painting. 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.
- F. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 23 05 93
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, steam, and refrigerating systems.
- C. Measurement of final operating condition of HVAC systems.
- D. Sound measurement of equipment operating conditions.
- E. Commissioning activities.

1.2 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: Employment of testing agency and payment for services.
- B. Section 23 08 00 - 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 (Reaffirmed 2017).
- 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 01 30 00 - 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. Submit to the project engineer / Commissioning Authority.
 - 3. Submit six weeks prior to starting the testing, adjusting, and balancing work.
 - 4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
 - 5. Include at least the following in the plan:
 - a. Preface: An explanation of the intended use of the control system.
 - b. 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.
 - c. 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.

- d. Identification and types of measurement instruments to be used and their most recent calibration date.
 - e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - f. Final test report forms to be used.
 - g. Detailed step-by-step procedures for TAB work for each system and issue, including:
 - 1) Terminal flow calibration (for each terminal type).
 - 2) Diffuser proportioning.
 - 3) Branch/submain proportioning.
 - 4) Total flow calculations.
 - 5) Rechecking.
 - 6) Diversity issues.
 - h. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. Field Logs: Submit at least once a week to project engineer / Commissioning Authority.
- E. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.
- F. Progress Reports.
- G. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Submit to the project engineer / Commissioning Authority within two weeks after completion of testing, adjusting, and balancing.
 - 2. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 3. 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.
 - 4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 6. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
- H. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.
- B. Maintain one copy of each document on site.
- C. Prior to commencing Work, calibrate each instrument to be used.

1.7 QUALIFICATIONS

- A. Agency: Company specializing in testing, adjusting, and balancing of systems specified in this section with minimum three years documented experience certified by AABC or Certified by NEBB.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

1.9 SEQUENCING

- A. Section 01 10 00 - Summary: Work sequence.
- B. Sequence balancing between completion of systems tested and Date of Substantial Completion.

1.10 SCHEDULING

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

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. Having minimum of three years documented experience.
 - 3. 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. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

3.3 PREPARATION

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
1. Require attendance by all installers whose work will be tested, adjusted, or balanced.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect and project engineer / Commissioning Authority to facilitate spot checks during testing.

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 5 percent of design for return and exhaust systems.
- B. 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. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

- H. 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 at site altitude.
- 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. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. 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.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. 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.
- H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- I. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.
- L. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.
- M. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

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 COMMISSIONING

- A. See Section 23 08 00 for additional requirements.
- B. Perform prerequisites prior to starting commissioning activities.
- C. Furnish to the project engineer / Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.
- D. Re-check minimum outdoor air intake flows and maximum and intermediate total airflow rates for 5 percent of the air handlers plus a random sample equivalent to 5 percent of the final TAB report data as directed by Commissioning Authority.
 - 1. Original TAB agency shall execute the re-checks, witnessed by the Commissioning Authority.
 - 2. Use the same test instruments as used in the original TAB work.
 - 3. Failure of more than 10 percent of the re-checked items of a given system shall result in the rejection of the system TAB report; rebalance the system, provide a new system TAB report, and repeat random re-checks.
 - 4. For purposes of re-check, failure is defined as follows:
 - a. Air Flow of Supply and Return: Deviation of more than 10 percent of instrument reading.
 - b. Minimum Outside Air Flow: Deviation of more than 20 percent of instrument reading; for inlet vane or VFD OSA compensation system using linear proportional control, deviation of more than 30 percent at intermediate supply flow.
 - c. Temperatures: Deviation of more than one degree F.
 - d. Air and Water Pressures: Deviation of more than 10 percent of full scale of test instrument reading.
 - e. Sound Pressures: Deviation of more than 3 decibels, with consideration for variations in background noise.
 - 5. For purposes of re-check, a whole system is defined as one in which inaccuracies will have little or no impact on connected systems; for example, the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system.
- E. In the presence of the Commissioning Authority, verify that:
 - 1. Final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked.
 - 2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.
 - 3. The water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full cooling the cooling coil valve of that leg is 90 percent or more open.
- F. No seasonal tests are required.
- G. No further monitoring is required.
- H. No deferred testing is required.

3.9 SCOPE

- A. Test, adjust, and balance the following:

3.10 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. Air Cooled Condensers:
1. Identification/number.
 2. Location.
 3. Manufacturer.
 4. Model number.
 5. Serial number.
 6. Entering DB air temperature, design and actual.
 7. Leaving DB air temperature, design and actual.
 8. Number of compressors.
- C. Cooling Coils:
1. Identification/number.
 2. Location.
 3. Service.
 4. Manufacturer.
 5. Air flow, design and actual.
 6. Entering air DB temperature, design and actual.
 7. Entering air WB temperature, design and actual.
 8. Leaving air DB temperature, design and actual.
 9. Leaving air WB temperature, design and actual.
 10. Water flow, design and actual.
 11. Water pressure drop, design and actual.
 12. Entering water temperature, design and actual.
 13. Leaving water temperature, design and actual.
 14. Saturated suction temperature, design and actual.
 15. Air pressure drop, design and actual.
- D. 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.

- E. 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.

- F. 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.

- G. 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.

- H. 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.
 - 9. Air temperature.
 - 10. Air correction factor.

- I. Duct Leak Tests:

1. Description of ductwork under test.
 2. Duct design operating pressure.
 3. Duct design test static pressure.
 4. Duct capacity, air flow.
 5. Maximum allowable leakage duct capacity times leak factor.
 6. Test apparatus:
 - a. Blower.
 - b. Orifice, tube size.
 - c. Orifice size.
 - d. Calibrated.
 7. Test static pressure.
 8. Test orifice differential pressure.
 9. Leakage.
- J. 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.
- K. 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.
 9. Test (final) air flow.
 10. Percent of design air flow.
- L. Sound Level Reports:
1. Location.
 2. Octave bands - equipment off.
 3. Octave bands - equipment on.
- M. Vibration Tests:
1. Location of points:
 - a. Fan bearing, drive end.
 - b. Fan bearing, opposite end.
 - c. Motor bearing, center (if applicable).
 - d. Motor bearing, drive end.
 - e. Motor bearing, opposite end.
 - f. Casing (bottom or top).
 - g. Casing (side).
 - h. Duct after flexible connection (discharge).
 - i. Duct after flexible connection (suction).
 2. Test readings:
 - a. Horizontal, velocity and displacement.

- b. Vertical, velocity and displacement.
- c. Axial, velocity and displacement.
- 3. Normally acceptable readings, velocity and acceleration.
- 4. Unusual conditions at time of test.
- 5. Vibration source (if non-complying).

END OF SECTION

SECTION 23 07 13
DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.
- C. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 91 23 - Interior Painting: Painting insulation jackets.
- C. Section 23 05 53 - Identification for HVAC Piping and Equipment.
- D. Section 23 31 00 - HVAC Ducts and Casings: Glass fiber ducts.

1.3 REFERENCE STANDARDS

- A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- E. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.
- F. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- I. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- J. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of experience and approved by manufacturer.

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. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. K value: .28 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 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.

2.3 GLASS FIBER, RIGID

- A. Manufacturer:
 - 1. CertainTeed Corporation: www.certainteed.com/#sle.
 - 2. Johns Manville: www.jm.com/#sle.
- B. Insulation: ASTM C612; rigid, noncombustible blanket.
 - 1. K Value:.28 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 pcf.
- 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.

2.4 JACKETING AND ACCESSORIES

- A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.
- B. Mineral Fiber (Outdoor) Jacket: Asphalt impregnated and coated sheet, 50 lb/square.
- C. Exterior Ductwork Jacketing:
 - 1. Description: Zero permeability, absolute vapor barrier for insulation cladding and jacketing applications.
 - 2. Thickness: 6.0 mils.
 - 3. Maximum Temperature: 300 Deg F.
 - 4. Puncture Resistance: 35.4 lbs.
- D. Aluminum Jacket:
 - 1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
 - 2. Thickness: 0.016 inch sheet.
 - 3. Finish: Smooth.
 - 4. Joining: Longitudinal slip joints and 2 inch laps.
 - 5. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.

2.5 DUCT LINER

- A. Manufacturers:
 - 1. CertainTeed Corporation: www.certainteed.com/#sle.
 - 2. Johns Manville: www.jm.com/#sle.
- B. Glass Fiber Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.
 - 1. Fungal Resistance: No growth when tested according to ASTM G21.
 - 2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
 - 3. Service Temperature: Up to 250 degrees F.
 - 4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
 - 5. Minimum Noise Reduction Coefficients:

- a. 1 inch Thickness: 0.45.
- C. Adhesive: Waterproof, fire-retardant type, ASTM C916.
- D. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

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. Insulated Ducts Conveying Air Below Ambient Temperature:
- C. Insulated Ducts Conveying Air Above Ambient Temperature:
- D. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor): Finish with canvas jacket sized for finish painting.
- E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with outdoor jacket finished; see Section 23 31 00.
- F. 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.
 - 4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
- G. 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 airflow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES

- A. Combustion Air Duct:
 - 1. 1" rigid liner.
- B. Exhaust Ducts Within 10 ft of Exterior Openings:
 - 1. 1" rigid liner.
- C. Outside Air Intake Ducts:
 - 1. 1" rigid in exposed locations.
 - 2. 2" flexible for concealed.
- D. Supply and Return Ducts:
 - 1. 1" rigid liner for exposed applications.

2. 2" flexible for concealed.
 3. 2" rigid for mechanical rooms.
- E. Grease duct:
1. Two layers of 1.5" hazardous exhaust duct insulation.
- F. Exterior duct:
1. 2" rigid finished with aluminum duct jacket.
- G. Ducts within 10 ft of fans:
1. 1" rigid liner upstream and downstream of fan.
- H. Relief ductwork within 10 ft of exterior opening:
1. 1" rigid liner in exposed applications.
 2. 2" flexible for concealed.
- I. Transfer ducts:
1. 1" rigid liner.
- J. Dishwasher exhaust:
1. 1" rigid for exposed in unconditioned spaces.
 2. 2" flexible for concealed.
- K. Kiln exhaust:
1. 1" rigid for exposed applications.
 2. 2" flexible for concealed.

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 07 84 00 - Firestopping.
- C. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.
- D. Section 23 23 00 - Refrigerant Piping: Placement of 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 C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.
- D. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).
- E. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2018).
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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. Johns Manville Corporation: www.jm.com/#sle.
- 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; 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.
- 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.

2.3 CELLULAR GLASS

- A. Block Insulation: ASTM C552, Type I, Grade 6.
 - 1. K Value: 0.35 at 100 degrees F.
 - 2. Service Temperature: 800 degrees F, maximum.
 - 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. Manufacturers:
 1. Armacell LLC: www.armacell.us/#sle.
 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. 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: 180 degrees F.
 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. All fittings shall be constructed of like material and sealed per insulation manufacturer recommendations. Fiberglass insulation with fitting covers shall not be accepted.

2.5 JACKETING AND ACCESSORIES

- A. PVC Plastic.
 1. Manufacturers:
 - a. Johns Manville Corporation: www.jm.com/#sle.
 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, 0.010 inch.
 - e. Connections: Brush on welding adhesive.
 3. Covering Adhesive Mastic: Compatible with insulation.

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.
- I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 84 00.
- J. 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: Glass Fiber Insulation:
 - a. Pipe sizes 1/2" to 1-1/4" = 1-1/2" thick.
 - b. Pipe sizes 1-1/2" and greater = 2" thick.
- B. Cooling Systems (Including Heat Pump/VRF):
1. Condensate Drains from Cooling Coils: Flexible Elastomeric Cellular Insulation; All pipe sizes = 1 1/2" thick.
 2. All refrigerant piping: Flexible Elastomeric Cellular Insulation; All pipe sizes = 1 1/2" thick.

END OF SECTION

SECTION 23 08 00
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SUMMARY

- A. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for demonstrating proper operation to the commissioning authority. A commissioning authority who is hired by the owner shall supervise and approve all commissioning activities.
- B. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.
- C. The following HVAC equipment is to be commissioned, including commissioning activities for the following specific items:
 - 1. HVAC controls, including equipment / system sequences of operations.
 - 2. DDC front-end controls graphics.
 - 3. Air handling units and associated controls.
 - 4. Split-system air conditioning units.
 - 5. Exhaust fans and EF systems.
 - 6. Major and minor equipment items.
 - 7. Piping systems and equipment.
 - 8. Ductwork and accessories.
 - 9. Terminal units.
 - 10. Service water heating system
 - 11. Lighting control systems
 - 12. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- D. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.2 RELATED REQUIREMENTS

- A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
- B. Section 23 09 93 - Sequence of Operations for HVAC Controls.

1.3 REFERENCE STANDARDS

- A. ASHRAE Guideline 1.1 - The HVAC&R Technical Requirements for the Commissioning Process; 2007, with Errata (2012).

1.4 SUBMITTALS

- A. Updated Submittals: Keep the owner, owner's representative, and project engineer, and Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.
- B. Draft Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:

1. System name.
 2. List of devices.
 3. Step-by-step procedures for testing each controller after installation, including:
 - a. Process of verifying proper hardware and wiring installation.
 - b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
 - c. Process of performing operational checks of each controlled component.
 - d. Plan and process for calibrating valve and damper actuators and all sensors.
 - e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
 4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has "passed" and is operating within the contract parameters.
 5. Description of the instrumentation required for testing.
 6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the project engineer and Commissioning Authority and TAB contractor for this determination.
- C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of project engineer, and Commissioning Authority.
- D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
 2. Full as-built set of control drawings.
 3. Full as-built sequence of operations for each piece of equipment.
 4. Full print out of all schedules and set points after testing and acceptance of the system.
 5. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
 6. Control equipment component submittals, parts lists, etc.
 7. Warranty requirements.
 8. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
 9. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
 - a. Sequences of operation.
 - b. Control drawings.
 - c. Points lists.
 - d. Controller and/or module data.
 - e. Thermostats and timers.
 - f. Sensors and DP switches.
 - g. Valves and valve actuators.
 - h. Dampers and damper actuators.
 - i. Program setups (software program printouts).
- E. Project Record Documents: See Section 01 78 00 for additional requirements.
1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
 2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.
- C. Provide the use of Testing and Balancing instruments used by sub-contractors, for consistency of measurements and calibration.

PART 3 EXECUTION

3.1 PREPARATION

- A. Cooperate with the project engineer, and Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.
- B. Furnish additional information requested by the construction manager, project engineer, and Commissioning Authority.
- C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.
- D. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.
 - 1. Include cost of sheaves and belts that may be required for testing, adjusting, and balancing.
- E. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.
- F. Provide temperature and pressure taps in accordance with Contract Documents.
 - 1. Provide a pressure/temperature plug at each new water sensor that is an input point to the control system.

3.2 INSPECTING AND TESTING - GENERAL

- A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.
- B. Perform the Functional Tests for each item of equipment or other assembly to be commissioned.
- C. Provide two-way radios for use during the testing.
- D. Test all functions that are described in the sequence of operations.

- E. Valve/Damper Stroke Setup and Check:
 - 1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 - 2. Set pump/fan to normal operating mode.
 - 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 - 4. Command valve/damper open; verify position is full open and adjust output signal as required.
 - 5. Command valve/damper to a few intermediate positions.
 - 6. If actual valve/damper position does not reasonably correspond, replace actuator.
 - 7. Closure for Heating Coil Valves - Normally Open:
 - a. Set heating setpoint 20 degrees F above room temperature.
 - b. Observe valve open.
 - c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
 - d. Restore to normal.
 - e. Set heating setpoint to 20 degrees F below room temperature.
 - f. Observe the valve close.
 - g. Restore to normal.
 - 8. Closure for Cooling Coil Valves - Normally Closed:
 - a. Set cooling setpoint 20 degrees F above room temperature.
 - b. Observe the valve close.
 - c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
 - d. Restore to normal.
 - e. Set cooling setpoint to 20 degrees F below room temperature.
 - f. Observe valve open.
 - g. Restore to normal.
- F. Isolation Valve or System Valve Leak Check: For valves not by coils.
 - 1. With full pressure in the system, command valve closed.
 - 2. Use an ultra-sonic flow meter to detect flow or leakage.
- G. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.3 TAB COORDINATION

- A. TAB: Testing, adjusting, and balancing of HVAC.
- B. Coordinate commissioning schedule with TAB schedule.
- C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.
- D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.
- E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.
- F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.4 CONTROL SYSTEM FUNCTIONAL TESTING

- A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of Contract Documents and the detailed Sequences of Operation documentation submittal.
- B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with Contract Documents.
- C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system.
- D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
 - 1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Owner.
 - 2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.
- E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.
- F. Demonstrate the following to the owner, project engineer, and Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
 - 1. Setpoint changing features and functions.
 - 2. Sensor calibrations.
- G. Demonstrate to the owner, project engineer, and Commissioning Authority:
 - 1. That all specified functions and features are set up, debugged and fully operable.
 - 2. That scheduling features are fully functional and setup, including holidays.
 - 3. That all graphic screens and value readouts are completed.
 - 4. Correct date and time setting in central computer.
 - 5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.
 - 6. Power failure and battery backup and power-up restart functions.
 - 7. Global commands features.
 - 8. O&M schedules and alarms.
 - 9. Occupancy sensors and controls.
 - 10. All control strategies and sequences not tested during controlled equipment testing.
- H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

3.5 OPERATION AND MAINTENANCE MANUALS

- A. See Section 01 78 00 for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

- C. Submit manuals related to items that were commissioned to project engineer and Commissioning Authority for review; make changes recommended by project engineer and the Commissioning Authority.

3.6 PRELIMINARY COMMISSIONING REPORT

- A. The preliminary commissioning report shall include the following:
 - 1. Itemization of deficiencies found during the testing required by this section that have not been corrected at the time of report preparation.
 - 2. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions.
 - 3. Climatic conditions required for performance of the deferred tests.
 - 4. Results of functional performance tests.
 - 5. Functional performance test procedures used during the commissioning process, including measurable criteria for test acceptance.

3.7 FINAL COMMISSIONING REPORT

- A. See Section 01 78 00 for additional requirements
- B. The final commissioning report shall include the following:
 - 1. Results of functional performance tests.
 - 2. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.
 - 3. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repetability.
- C. The final report shall be submitted to the engineer as a submittal for approval, and will serve as the final indication that all work has been executed in accordance with the design.
- D. The final report and any other documentation listed above shall be turned over to the building owner or owner's authorized agent within 90 days of the the date of receipt of the certificate of occupancy.

END OF SECTION

SECTION 23 09 23
DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. This project is an extension of the existing Schneider Electric EcoStruxure for building operation system. The owner will purchase temperature controls for HVAC systems by OGS state contract. This section is included for reference; the Heating Contractor will be responsible for installing control components in the piping and ductwork system, such as but not excluding the following: Automatic Control Dampers, Automatic Control Valves, Temperature Sensing Thermal Wells and Pressure Control Sensing Taps.
- B. In accordance to the scope of work, the system shall also provide a graphical, web-based, operator interface that allows for instant access to any system through a standard browser. The contractor must provide PC-based programming workstations, operator workstations and microcomputer controllers of modular design providing distributed processing capability and allowing future expansion of both input/output points and processing/control functions. For this project, the system shall consist of the following components:
- C. Administration and Programming Workstation(s): The BAS Contractor shall include Operation software and architecture as described in Part 2 of the specification. These workstations must be running the standard workstation software developed and tested by the manufacturer of the network server controllers and the standalone controllers. No third-party front-end workstation software will be acceptable. Workstations must conform to the B-OWS BACnet device profile.
- D. Web-Based Operator Workstations: The BAS Contractor shall furnish licenses for web connection to the BAS system. Web-based users shall have access to all system points and graphics, shall be able to receive and acknowledge alarms, and shall be able to control setpoints and other parameters. All engineering work, such as trends, reports, graphics, etc. that are accomplished from the WorkStation shall be available for viewing through the web browser interface without additional changes. The web-based interface must conform to the B-OWS BACnet device profile. There will be no need for any additional computer-based hardware to support the web-based user interface.
- E. Ethernet-based Network Router and/or Network Server Controller(s): The BAS Contractor shall furnish needed quantity of Ethernet-based Network Server Controllers as described in Part 2 of the specification. These controllers will connect directly to the Operator Workstation over Ethernet at a minimum of 100mbps and provide communication to the Standalone Digital Control Units and/or other Input/Output Modules. Network Server Controllers shall conform to BACnet device profile B-BC. Network controllers that utilize RS232 serial communications or ARCNET to communicate with the workstations will not be accepted. Network Controllers shall be tested and certified by the BACnet Testing Laboratory (BTL) as BACnet Building Controllers (B-BC).
- F. Standalone Digital Control Units (SDCUs): Provide the necessary quantity and types of SDCUs to meet the requirements of the project for mechanical equipment control including air handlers, central plant control, and terminal unit control. Each SDCU will operate completely standalone, containing all of the I/O and programs to control its associated equipment. Each BACnet protocol SDCU shall conform to the BACnet device profile B-AAC. BACnet SDCUs shall be tested and certified by the BACnet Testing Laboratory (BTL) as BACnet Advanced Application Controllers (B-AAC).
- G. The Local Area Network (LAN) shall be either a 10 or 100 Mbps Ethernet network supporting BACnet, Modbus, XML and HTTP for maximum flexibility for integration of building data with

enterprise information systems and providing support for multiple Network Server Controllers (NSCs), user workstations and a local host computer system.

- H. The Enterprise Ethernet (IEEE 802.3) LAN shall utilize Carrier Sense Multiple/Access/Collision Detect (CSMA/CD), Address Resolution Protocol (ARP) and User Datagram Protocol (UDP) operating at 10 or 100 Mbps.
- I. The system shall enable an open architecture that utilizes ANSI / ASHRAE™ Standard 135-2004, BACnet functionality to assure interoperability between all system components. Native support for the ANSI / ASHRAE™ Standard 135-2004 BACnet protocol are required to assure that the project is fully supported to reduce future building maintenance, upgrade, and expansion costs.
- J. The system shall enable an architecture that utilizes a MS/TP selectable 9.6-76.8 Kbaud protocol, as a common communication protocol between controllers and integral ANSI / ASHRAE™ Standard 135-2004, BACnet functionality to assure interoperability between all system components. The AAC shall be capable of communicating as a MS/TP device or as a BACnet IP device communicating at 10/100 Mbps on a TCP/IP trunk. The ANSI / ASHRAE™ Standard 135-2004, BACnet protocol is required to assure that the project is fully supported by the leading HVAC open protocol to reduce future building maintenance, upgrade, and expansion costs.
- K. The software tools required for network management of the ANSI / ASHRAE™ Standard 135-2004, BACnet protocol must be provided with the system. Drawings are diagrammatic only. Equipment and labor not specifically referred to herein or on the plans and are required to meet the functional intent, shall be provided without additional cost to the Owner. BACnet clients shall comply with the BACnet Operator Workstation (B-OWS) device profile; with the ability to support data read and write functionality. Physical connection of BACnet devices shall be via Ethernet IP or MS/TP. The system shall provide support for Modbus TCP and RTU protocols natively, and not require the use of gateways.
- L. Complete temperature control system to be DDC with electronic sensors and electronic/electric actuation of Mechanical Equipment Room (MER) valves and dampers and electronic actuation of terminal equipment valves and actuators as specified herein. The BMS is intended to seamlessly connect devices throughout the building regardless of subsystem type, i.e. variable frequency drives, low voltage lighting systems, electrical circuit breakers, power metering and card access should easily coexist on the same network channel.
- M. The supplied system must incorporate the ability to access all data using HTML5 enabled browsers without requiring proprietary operator interface and configuration programs. The system shall not require JAVA to be enabled in the browser.
- N. Data shall reside on a supplier-installed server for all database access.
- O. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network.
- P. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work and in the regular employment of the approved manufacturer's local field office. The approved manufacturer's local field office shall have a minimum of 3 years of installation experience with the manufacturer and shall provide documentation in the bid and submittal package verifying longevity of the installing company's relationship with the manufacturer when requested. Supervision, hardware and software engineering, calibration and checkout of the system shall be by the employees of the approved manufacturer's local field office and shall not be subcontracted. The control contractor shall have an in place support facility within 100 miles of the site with factory certified technicians and engineers, spare parts inventory and all necessary test and diagnostic equipment for the installed system, and the control contractor shall have 24 hours/day, 7 days/week emergency service available.

- Q. Provide the Commissioning, configuration and diagnostic tool (CCDT), color display personnel computer, software, and interfaces to provide uploading/downloading of High Point Count Controllers (AAC), Unitary Equipment Controllers (UEC) and VAV controllers (VAVDDC), monitoring all BACnet objects, monitoring overrides of all controller physical input/output points, and editing of controller resident time schedules.
- R. The system shall have the capability to provide a web-enabled PEMS (power and energy management system) monitoring system intended to monitor an entire electrical distribution infrastructure, from incoming utility feeds down to low voltage distribution points. It shall be designed to monitor and manage energy consumption throughout an enterprise, whether within a single facility or across a network of facilities, to improve energy availability and reliability, and to measure and manage energy efficiency. It shall be a standard product offering with no custom programming required. It shall provide a seamless user experience (“Single pane of glass”) for managing the mechanical systems (HVAC and lighting) and monitoring the power distribution system (transformers, breakers, relays, switches, capacitors, UPS, invertors, etc.) Pricing is to be a separate line item from the BAS proposal. See specification 26 09 13 for exact requirements.

1.2 STANDARD TERMS

- A. Standard HVAC Terms:
 - 1. ASHRAE: American Society Heating, Refrigeration, Air Conditioning Engineers
 - 2. AHU: Air Handling Unit
 - 3. BACnet: Building Automation Controls Network
 - 4. BMS: Building Management System
 - 5. DDC: Direct Digital Control
 - 6. EIA: Electronic Industries Alliance
 - 7. GUI: Graphical User Interface
 - 8. HVAC: Heating, Ventilation, and Air Conditioning
 - 9. IEEE: Institute Electrical Electronic Engineers
 - 10. MER: Mechanical Equipment Room
 - 11. PID: Proportional, Integral, Derivative
 - 12. VAV: Variable Air Volume Box
- B. Communications and protocols:
 - 1. ARP: Address Resolution Protocol
 - 2. BACnet: Building Automation and Control Networks
 - 3. CORBA: Common Object Request Broker Architecture
 - 4. CSMA/CD: Carrier Sense Multiple Access/Collision Detect
 - 5. DDE: Dynamic Data Exchange
 - 6. FTP: File Transfer Protocol
 - 7. FTT: Free Topology Transceivers
 - 8. HTTP: Hyper Text Transfer Protocol
 - 9. IIOB: Internet Inter-ORB Protocol
 - 10. IP: Internet Protocol
 - 11. LAN: Local Area Network
 - 12. LON: Echelon Communication – Local Operating Network
 - 13. MS/TP: Master Slave Token Passing
 - 14. OBIX: Open Building Information Exchange
 - 15. ODBC: Open Database Connectivity
 - 16. ORB: Object Request Broker
 - 17. SNVT: Standard Network Variables Types
 - 18. SQL: Structured Query Language
 - 19. UDP: User Datagram Protocol
 - 20. XML: eXtensible Markup Language
- C. Controllers:

1. ASD: Application Specific Device
2. AAC: Advanced Application Controller
3. ASC: Application Specific Controller.
4. CAC: Custom Application Controller.
5. DCU: Distributed Control Unit
6. LCM: Local Control Module
7. MC: MicroControllers
8. MP: Multi-purpose
9. MPC: Multi-purpose Controller
10. MPV: Multi-purpose VAV controller
11. NSC: Network Server Controller
12. PEM: Package Equipment Module
13. PPC: Programmable Process Controller
14. RC: Room controller
15. SDCU: Standalone Digital Control Units
16. SLC: Supervisory Logic Controller
17. UEC: Unitary Equipment Controller
18. VAVDDC: Variable Air Volume Direct Digital Controller

D. Tools and Software:

1. AFDD: Automated Fault Detection and Diagnostic
2. APEO: Automated Predictive Energy Optimization
3. DR: Demand Response
4. CCDT: Configuration, Commissioning and Diagnostic Tool
5. BPES: BACnet Portable Engineering Station
6. LPES: LON Portable Engineering Station
7. POT: Portable Operator's Terminal
8. PEMS: Power and Energy Management Software

1.3 WORK BY OTHERS

- A. The BAS Contractor shall cooperate with other contractors performing work on this project necessary to achieve a complete and neat installation. To that end, each contractor shall consult the drawings and specifications for all trades to determine the nature and extent of others' work.
- B. The BAS Contractor shall furnish all Airflow Stations, Control Dampers, Control Valves, Flow Meters, Flow Switches, Sensor Wells and other similar equipment for installation by the Mechanical Contractor and/or others.
- C. The BAS Contractor shall provide field supervision to the designated contractor for the installation of the following:
 1. Automatic control dampers
 2. The Electrical Contractor shall provide:
 - a. All 120VAC power wiring to motors, heat trace, junction boxes for power to BAS panels.
 - b. Furnish smoke detectors and wire to the building fire alarm system. HVAC Contractor to mount devices.

1.4 CODE COMPLIANCE

- A. Provide BAS components and ancillary equipment, which are UL-916 listed and labeled.
- B. All equipment or piping used in conditioned air streams, spaces or return air plenums shall comply with NFPA 90A Flame/Smoke/Fuel contribution rating of 25/50/0 and all applicable building codes or requirements.
- C. All wiring shall conform to the National Electrical Code.

- D. All smoke dampers shall be rated in accordance with UL 555S.
- E. Comply with FCC rules, Part 15 regarding Class A radiation for computing devices and low power communication equipment operating in commercial environments.
- F. Comply with FCC, Part 68 rules for telephone modems and data sets.

1.5 QUALITY ASSURANCE

- A. All labor, material, equipment and software necessary to meet the functional intent of the system, as specified herein and as shown on the drawings, shall be provided by Day Automation Systems. Equipment and labor not specifically referred to herein or on the plans, which are required to meet the functional intent, shall be provided without additional cost to the Owner. This contractor also is responsible for all costs of changes in the work required by substitute equipment.
- B. The Building Management System (BMS) Contractor must have been in business for not less than 10 years and providing BMS systems must be the Contractor's primary business. BMS Contractor must be an authorized distributor or branch office of the manufacturers specified. BMS Contractor must have a trained staff of application engineers, project managers, software engineers, commissioning staff, and service staff experienced in the configuration, programming and service of the automation system.
- C. The BMS Contractor shall have a training facility with regularly scheduled training so as to provide ongoing regularly scheduled application training.
- D. Electrical standards: Provide electrical products that comply with the following agency approvals:
 - 1. UL-916; Energy Management Systems for BAS components and ancillary equipment
 - 2. UL-873; Temperature Indication and Regulating Equipment
 - 3. FCC, Part 15, Subpart J, Class A Computing Devices
- E. All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, Local and National codes.

1.6 SCOPE OF WORK

- A. Except as otherwise noted, the control system shall consist of all Ethernet Network Controllers, Standalone Digital Control Units, workstations, software, sensors, transducers, relays, valves, dampers, damper operators and other accessory equipment, along with a complete system of electrical interlocking wiring as required to fill the intent of the specification and provide for a complete and operable system. Except as otherwise specified, provide operators for equipment such as dampers if the equipment manufacturer does not provide these. Coordinate requirements with the various Contractors.
- B. Provide Schneider Electric EcoStruxure for building operation Front End Software Workstation for this project. All building systems graphics, scheduling and centralized alarming must be developed on this software to provide the campus one portal for the complete system from any existing EcoStruxure for building operation workstation.
- C. The BAS contractor shall review and study all HVAC drawings and the entire specification to familiarize themselves with the equipment and system operation and to verify the quantities and types of dampers, operators, alarms, etc. to be provided.
- D. All interlocking, wiring and installation of control devices associated with the equipment listed below shall be provided under this Contract. When the BAS system is fully installed and operational, the BAS Contractor shall review and check out the system. At that time, the BAS contractor shall demonstrate the operation of the system to the Owner and prove that it complies with the intent of the drawings and specifications.

1. The Contractor shall furnish and install a complete building automation system including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as called for in this specification.
- E. Provide services and manpower necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor and Owner's representative. Commissioning reports showing the testing of each DDC point on the system shall be submitted to the Engineer for review and approval upon completion of the commissioning process.

1.7 TRAINING

- A. The BAS Contractor shall provide both on-site and classroom training to the Owner's representative and maintenance personnel.
- B. The BAS Contractor shall have a dedicated training center with a minimum of 8 permanent workstations connected to a simulated system.
- C. Trainees must have the ability to access their system remotely during the classroom training session as required.
- D. The BAS Contractor's trainer must have a minimum of 10 years of experience with the manufacturer's software and products per the following description:
 1. On-site training shall consist of a minimum of (8) hours of hands-on instruction geared at the operation and maintenance of the systems. The curriculum shall include:
 - a. System Overview
 - b. System Software and Operation
 - 1) System access
 - 2) Software features overview
 - 3) Changing setpoints and other attributes
 - 4) Scheduling
 - 5) Editing programmed variables
 - 6) Displaying color graphics
 - 7) Running reports
 - 8) Workstation maintenance
 - 9) Application programming
 - c. Operational sequences including start-up, shutdown, adjusting and balancing.
 - d. Equipment maintenance
- E. Classroom training shall include a minimum of (6) training slots for two days of course material covering workstation operation and controller programming.
- F. The training facility shall have the capability to provide hands on training experience for all applications that can be run on the Schneider Electric EcoStruxure application.
- G. The training facility shall have the capability to train on the owners' system through off site connection.

1.8 WORK BY OTHERS

- A. The BAS Contractor shall cooperate with other contractors performing work on this project necessary to achieve a complete and neat installation. To that end, each contractor shall consult the drawings and specifications for all trades to determine the nature and extent of others' work.
- B. The BAS Contractor shall furnish all control valves, sensor wells, flow meters and other similar equipment specified in this section for installation by the Mechanical Contractor.
- C. The BAS Contractor shall provide field supervision to the designated contractor for the installation of the following:

1. Automatic Control Dampers
2. Automatic Control Valves.
3. Temperature Sensing Thermal Wells
4. Pressure Control Sensing Taps

1.9 COORDINATION

- A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.
- B. Coordinate equipment from other divisions including "Intrusion Detection," "Lighting Controls," "Motor Control Centers," "Panel boards," and "Fire Alarm" to achieve compatibility with equipment that interfaces with those systems.
- C. Coordinate supply of conditioned electrical circuits for control units and operator workstation.
- D. Coordinate with the Owner's IT department on locations for NSC's, Ethernet communication cabling and TCP/IP addresses.

1.10 WARRANTY AND ACCEPTANCE

- A. The microprocessor temperature control contractor shall warrant the control system installed in this contract to be free from defects in material and workmanship, except for damages from other causes, for a period of one year after final acceptance from the owner. The microprocessor temperature control contractor shall be responsible for all necessary revisions to the software required for a workable system performance through the first year of operation. Any changes in the software shall be transmitted immediately to the owner. The software responsibility is for a complete and workable system as described in the control cycle description of the specification. The software shall become the property of the owner.
- B. Updates to the manufacturer's software shall be provided at no charge during the warranty period.
- C. All equipment required to maintain operation of the temperature control system for the project shall be stocked in the microprocessor temperature control contractor's local facility. It shall be immediately available in the event of component failure. A spare or loaner piece of equipment shall be installed immediately when a failure occurs, and the equipment shall be returned to the factory for repair.
- D. Submit a proposal to provide all services, materials and the equipment necessary for preventative maintenance on the entire system for a period of one year. The work covered in this proposal shall include maintenance of the control equipment including all computer equipment, CPU, peripherals, transmission equipment, and related HVAC control devices.

1.11 SUBMITTALS

- A. Shop drawings shall include a riser diagram depicting locations of all controllers and workstations, with associated network wiring. Also included shall be individual schematics of each mechanical system showing all connected points with reference to their associated controller. Typical schematics will be allowed where appropriate.
 1. Each drawing containing an equipment schematic shall contain a table indicating what equipment is covered by this drawing (i.e. equipment "tag #") and which drawing in the Construction Document set this piece of equipment is shown on.
- B. Submittal data shall contain manufacturer's data on all hardware and software products required by the specification. Valve, damper and airflow station schedules shall indicate size, configuration, capacity and location of all equipment.

- C. Submit a digital copy of submittal data and shop drawings to the Engineer for review prior to ordering or fabrication of the equipment. Prior to submitting, the Contractor shall check all documents for accuracy.
- D. The Engineer will make corrections, if required, and return to the Contractor. The Contractor shall then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Engineer and the submittals are fully approved.
- E. Each point in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the BAS shall be tested against the appropriate sequence of operation specified herein. Successful completion of the system test shall constitute the beginning of the warranty period. A written report shall be submitted to the owner indicating that the installed system functions in accordance with the plans and specifications.
- F. The BAS contractor shall commission and set in operating condition all major equipment and systems, such as the hot water and all air handling systems, in the presence of the equipment manufacturer's representatives, as applicable, and the Owner and Architect's representatives. See Section 3.6 for detail required in Commissioning the system.
- G. The BAS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The BAS Contractor shall have a trained technician available on request during the balancing of the systems. The BAS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract.

1.12 OPERATING AND MAINTENANCE MANUALS

- A. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the lead-time and expected frequency of use of each part clearly identified.
- B. Following project completion and testing, the BAS contractor shall submit as-built drawings reflecting the exact installation of the system.

1.13 OWNERSHIP

- A. The Owner shall retain licenses to software for this project.
- B. The Owner shall sign a copy of the manufacturer's standard software and firmware licensing agreement as a condition off this contractor. Such license shall grant use of all programs and application software to the Owner as defined by the manufacturer's license agreement but shall protect the manufacturer's rights to disclosure of Trade Secrets contained within such software.
- C. The licensing agreement shall not preclude the use of the software by individuals under contract to the owner for commissioning, servicing or altering the system in the future. Use of the software by individuals under contract to the owner shall be restricted to use on the owner's computers and only for the purpose of commissioning, servicing, or altering the installed system.
- D. All project developed software, files and documentation shall become the property of the Owner. These include but are not limited to:
 - 1. Server and workstation software
 - 2. Application programming tools

3. Configuration tools
4. Network diagnostic tools
5. Addressing tools
6. Application files
7. Configuration files
8. Graphic files
9. Report files
10. Graphic symbol libraries
11. All documentation

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturer - Provide the following microprocessor control system:
 1. Basis of Design: Schneider Electric EcoStruxure, provided and installed by Day Automation systems.
 2. No substitutions are acceptable.

2.2 SYSTEM ARCHITCTURE

- A. General
 1. The Building Automation System (BAS) shall consist of Network Server/Controllers (NSCs), a family of Standalone Digital Control Units (SDCUs), Administration and Programming Workstations (APWs), and Web-based Operator Workstations (WOWs). The BAS shall provide control, alarm detection, scheduling, reporting and information management for the entire facility, and Wide Area Network (WAN) if applicable.
 2. An Enterprise Level BAS shall consist of an Enterprise Server, which enables multiple NSCs (including all graphics, alarms, schedules, trends, programming, and configuration) to be accessible from a single Workstation simultaneously for operations and engineering tasks.
 3. The Enterprise Level BAS shall be able to host up to 250 servers, or NSCs, beneath it.
 4. For Enterprise reporting capability and robust reporting capability outside of the trend chart and listing ability of the Workstation, a Reports Server shall be installed on a Microsoft Windows SQL based computer. The Reports Server can be installed on the same computer as the Enterprise Server.
 5. The system shall be designed with a top-level 10/100bT Ethernet network, using the BACnet/IP and/or Modbus TCP protocol.
- B. Modbus RTU/ASCII (and J-bus), Modbus TCP, BACnet MS/TP, BACnet IP and WebServices shall be native to the NSCs. There shall not be a need to provide multiple NSCs to support all the network protocols, nor should there be a need to supply additional software to allow all three protocols to be natively supported.
- C. A sub-network of SDCUs using the BACnet IP protocol shall connect the local, stand-alone controllers with Ethernet-level Network Server Controllers/IP Routers.
- D. TCP/IP Level
 1. The TCP/IP layer connects all of the buildings on a single Wide Area Network (WAN) isolated behind the campus firewall. Fixed IP addresses for connections to the campus WAN shall be used for each device that connects to the WAN.
- E. Fieldbus Level with Standalone Digital Control Units (SDCUs)
 1. The fieldbus layer shall support all of the following types of SDCUs:
 - a. BACnet IP SDCU requirements: The system shall consist of one or more BACnet/IP field buses managed by the Network Server Controller. The field bus layer shall

consist of up to 50 IP SDCUs in daisy chain topology, or 36 if using RSTP, per layer, with a max of 5 sub networks in daisy chain for a total of 250 SDCUs or 6 sub networks in RSTP for a total of 234 SDCUs. The field bus layer shall consist ONLY of BACnet IP SDCUs. No other protocols, including BACnet MS/TP, shall be acceptable.

- F. BAS LAN Segmentation
 - 1. The BAS shall be capable of being segmented, through software, into multiple local area networks (LANs) distributed over a wide area network (WAN). Workstations can manage a single LAN (or building), and/or the entire system with all portions of that LAN maintaining its own, current database.
- G. Standard Network Support
 - 1. All NSCs, Workstation(s) and Servers shall be capable of residing directly on the owner's Ethernet TCP/IP LAN/WAN with no required gateways. Furthermore, the NSC's, Workstation(s), and Server(s) shall be capable of using standard, commercially available, off-the-shelf Ethernet infrastructure components such as routers, switches and hubs. With this design the owner may utilize the investment of an existing or new enterprise network or structured cabling system. This also allows the option of the maintenance of the LAN/WAN to be performed by the owner's Information Systems Department as all devices utilize standard TCP/IP components.
- H. System Expansion
 - 1. The BAS system shall be scalable and expandable at all levels of the system using the same software interface, and the same TCP/IP level and fieldbus level controllers. Systems that require replacement of either the workstation software or field controllers in order to expand the system shall not be acceptable.
 - 2. Web-based operation shall be supported directly by the NSCs and require no additional software.
 - 3. The system shall be capable of using graphical and/or line application programming language for the Network Server Controllers.
- I. Support For Open Systems Protocols
 - 1. All Network Server Controllers must natively support the BACnet IP, BACnet MS/TP, Modbus TCP, Modbus RTU (RS-485 and RS-232), and Modbus ASCII protocols.

2.3 OPERATOR WORKSTATION REQUIREMENTS

- A. General
 - 1. The operator workstation portion of the BAS shall consist of one or more full-powered configuration and programming workstations, and one or more web-based operator workstations. For this site provide a minimum 4 concurrent engineering users within the enterprise server.
 - 2. The programming and configuration workstation software shall allow any user with adequate permission to create and/or modify any or all parts of the NSC and/or Enterprise Server database.
 - 3. Web-based workstations (webstations) shall have a minimum of 20 concurrent operator users.
 - 4. All configuration workstations shall be personal computers operating under the Microsoft Windows operating system. The application software shall be capable of communication to all Network Server Controllers and shall feature high-resolution color graphics, alarming, trend charting. It shall be user configurable for all data collection and data presentation functions.
 - 5. A minimum of 1 physical Workstations shall be allowed on the Ethernet network. In this client/server configuration, any changes or additions made from one workstation will automatically appear on all other workstations since the changes are accomplished to the databases within the NSC. Systems with a central database will not be acceptable.

- B. Administration/Programming Workstation, Enterprise Server, and Enterprise Central Requirements:
1. The Enterprise Central shall consist of the following:
 - a. Processor
 - 1) Minimum: Intel Xeon E5-2407 2.20 GHz, 10M Cache
 - b. Memory
 - 1) Minimum: 16GB
 - c. Operating systems:
 - 1) Microsoft Windows 8.1 32-bit (Pro, Pro N, Enterprise, or Enterprise N)
 - 2) Microsoft Windows 8.1 64-bit (Pro, Pro N, Enterprise, or Enterprise N)
 - 3) Microsoft Windows 10 64-bit (Pro or Enterprise)
 - 4) Microsoft Windows Server 2012 64-bit (Standard, Datacenter, Essentials, or Foundation)
 - 5) Microsoft Windows Server 2012 R2 64-bit (Standard, Datacenter, Essentials, or Foundation)
 - 6) Microsoft Windows Server 2016 R2 64-bit (Standard, Datacenter, Essentials, or Foundation)
 - d. 10/100MBPS Ethernet NIC
 - e. 2-1Tb 7200 RPM SATA 3 RAID 1 Drive
 - f. Required additional software:
 - 1) Microsoft .Net 4.5
 - g. License agreement for all applicable software
 2. The workstation shall consist of the following:
 - a. Processor
 - 1) Intel Core i3-7500 3.4GHz
 - b. Memory
 - 1) 8 GB RAM, 1TB HDD
 - c. Operating systems:
 - 1) Microsoft Windows 10 64-bit (Pro or Enterprise)
 - d. Serial port, parallel port, USB port
 - e. 10/100MBPS Ethernet NIC
 - f. 1 TB HDD
 - g. DVD drive
 - h. High resolution (minimum 1920 x 1080), 22" flat panel display
 - i. Optical mouse and full function keyboard
 - j. Audio sound card and speakers
 - k. UPS Back-Up
 - l. License agreement for all applicable software.
- C. Web-Based Operator PC Requirements
1. Any user on the network can access the system, using the following software:
 - a. Internet Explorer 11
 - b. Mozilla Firefox
 - c. Google Chrome
- D. General Administration and Programming Workstation Software:
1. System architecture shall be truly client server in that the Workstation shall operate as the client while the NSCs shall operate as the servers. The client is responsible for the data presentation and validation of inputs while the server is responsible for data gathering and delivery.
 2. The workstation functions shall include monitoring and programming of all DDC controllers. Monitoring consists of alarming, reporting, graphic displays, long term data storage, automatic data collection, and operator-initiated control actions such as schedule and setpoint adjustments.

3. Programming of SDCUs shall be capable of being done either off-line or on-line from any operator workstation. All information will be available in graphic or text displays stored at the NSC. Graphic displays will feature animation effects to enhance the presentation of the data, to alert operators of problems, and to facilitate location of information throughout the DDC system. All operator functions shall be selectable through a mouse.

E. User Interface:

1. The BAS workstation software shall allow the creation of a custom, browser-style interface linked to the user when logging into any workstation. Additionally, it shall be possible to create customized workspaces that can be assigned to user groups. This interface shall support the creation of "hot-spots" that the user may link to view/edit any object in the system or run any object editor or configuration tool contained in the software. Furthermore, this interface must be able to be configured to become a user's "PC Desktop" – with all the links that a user needs to run other applications. This, along with the Windows user security capabilities, will enable a system administrator to setup workstation accounts that not only limit the capabilities of the user within the BAS software, but may also limit what a user can do on the PC and/or LAN/WAN. This might be used to ensure, for example, that the user of an alarm monitoring workstation is unable to shutdown the active alarm viewer and/or unable to load software onto the PC.
2. System shall be able to automatically switch between displayed metric vs. imperial units based on the workstation/webstations localization.
3. The BMS workstation/webstations shall be capable of multiple language display, including English, Spanish, German, French, Japanese, Italian, Finnish, Portuguese, Swedish, Russian, and traditional and simplified Chinese. The multiple languages shall not require additional add on software from the standard workstation installer and shall be selectable within said workstation.
4. Webstations shall have the capability to automatically re-direct to an HTTPS connection to ensure more secure communications.
5. Personalized layouts and panels within workstations shall be extended to webstations to ensure consistent user experiences between the two user interfaces.
6. Servers and clients shall have the ability to be located in different time zones, which are then synchronized via the NTP server.
7. Workstation shall indicate at all times the communication status between it and the server.

F. User Security:

1. The software shall be designed so that each user of the software can have a unique username and password. The system must allow a minimum of 256 users to be configured per workstation. Additionally, the software shall enable the ability to add/remove users based upon Microsoft Windows Security Domains that enable the customer IT department to assist in user access.
2. Additional requirements include mandatory change of passwords:
 - a. At first logon with default credentials.
 - b. Of admin passwords before deploying.
3. No general accounts, one account per user.
4. Capability to integrate and use Windows Active Directory for user log on credentials.
5. Include a timed auto log off feature.
6. Use TLS 1.2 encryption or higher.
7. Capability to use blacklisted and whitelisted IPs/MAC addresses to gate access.
8. All devices and software that support HTTP shall allow disabling the HTTP access and require access via HTTPS.
9. All devices that have web portals for the configuration of IP addresses and other configuration attributes shall have the ability, through commands issued, to disable this service upon completion. A direct connection method with ASCII commands shall enable this service again if changes need to be applied. Loss of power or cycling the device shall not reverse this command. Disabling this web portal eliminates the security risk and the need for updating security patches.

10. All devices shall support SNMP V3 monitoring of network performance and stack statistics for the purpose of managing denial of service attacks
 11. The Integrated Control Platform shall support the feature to alarm on a predetermined period of time until the default password for each device is changed from the default factory setting.
 12. The Integrated Control Platform shall support encrypted password authentication for all web services whether serving or consuming.
- G. Configuration Interface
1. The workstation software shall use a familiar Windows Explorer style interface for an operator or programmer to view and/or edit any object (controller, point, alarm, report, schedule, etc.) in the entire system. In addition, this interface shall present a “network map” of all controllers and their associated points, programs, graphics, alarms, and reports in an easy to understand structure. All object names shall be alphanumeric and use Windows long filename conventions.
 2. The configuration interface shall also include support for user defined object types. These object types shall be used as building blocks for the creation of the BAS database. They shall be created from the base object types within the system input, output, string variables, setpoints, etc., alarm algorithms, alarm notification objects, reports, graphics displays, schedules, and programs. Groups of user defined object types shall be able to be set up as a predefined aggregate of subsystems and systems. The configuration interface shall support copying/pasting and exporting/importing portions of the database for additional efficiency. The system shall also maintain a link to all “child” objects created. If a user wishes to make a change to a parent object, the software shall ask the user if he/she wants to update all of the child objects with the change.
- H. Color Graphic Displays
1. The system shall allow for the creation of user defined, color graphic displays for the viewing of mechanical and electrical systems, or building schematics. These graphics shall contain point information from the database including any attributes associated with the point (engineering units, etc.). In addition operators shall be able to command equipment or change setpoints from a graphic through the use of the mouse.
 2. Requirements of the color graphic subsystem include:
 - a. At a minimum, the user shall have the ability to import .gif, .png, .bmp, .jpeg, .tif, and CAD generated picture files as background displays, and layering shall be possible.
 - b. The system shall support HTML5 enabled graphics.
 - c. It shall be possible for the user to use JavaScript to customize the behavior of each graphic.
 - d. The editor shall use Scalable Vector Graphics (SVG) technology.
 - e. A built-in library of animated objects such as dampers, fans, pumps, buttons, knobs, gauges, and graphs which can be “dropped” on a graphic through the use of a software configuration “wizard”. These objects shall enable operators to interact with the graphic displays in a manner that mimics their mechanical equivalents found on field installed control panels.
 - f. Support for high DPI icons shall be included and automatically chosen if viewing on a high definition display such as Retina or 4K displays.
 - g. Using the mouse, operators shall be able to adjust setpoints, start or stop equipment, modify PID loop parameters, or change schedules.
 - h. Status changes or alarm conditions must be able to be highlighted by objects changing screen location, size, color, text, blinking or changing from one display to another.
 - i. Ability to link graphic displays through user defined objects, alarm testing, or the result of a mathematical expression. Operators must be able to change from one graphic to another by selecting an object with a mouse - no menus will be required.
 - j. It shall be possible to create and save graphical components and JavaScript code in reusable and transferrable, customized libraries.
 - k. Graphics should rescale based on whatever monitor or viewing device is being used.

- I. Be able to create graphics on varying layers that can be moved and repeated.
 - m. Be able to create graphics within varying window panes that can be moved and/or re-referenced. For example, creating the graphical menu within a pane and referencing it on every graphics page, therefore not rebuilding thus allowing for a single spot for updates that get pushed to all the pages that reference it.
 - n. The ability to create re-usable cascading menus.
 - o. The ability to have multiple instances of a graphic and edit one instance to change all.
 3. Additionally, the Graphics Editor portion of the Engineering Software shall provide the following capabilities:
 - a. Create and save pages.
 - b. Group and ungroup symbols.
 - c. Modify an existing symbol.
 - d. Modify an existing graphic page.
 - e. Rotate and mirror a symbol.
 - f. Place a symbol on a page.
 - g. Place analog dynamic data in decimal format on a page.
 - h. Place binary dynamic data using state descriptors on a page.
 - i. Create motion through the use of animated .gif files or JavaScript.
 - j. Place test mode indication on a page.
 - k. Place manual mode indication on a page.
 - l. Place links using a fixed symbol or flyover on a page.
 - m. Links to other graphics.
 - n. Links to web sites.
 - o. Links to notes.
 - p. Links to time schedules.
 - q. Links to any .exe file on the operator work station.
 - r. Links to .doc files.
 - s. Assign a background color.
 - t. Assign a foreground color.
 - u. Place alarm indicators on a page.
 - v. Change symbol/text/value color as a function of an analog variable.
 - w. Change a symbol/text/value color as a function of a binary state.
 - x. Change symbol/text/value as a function of a binary state.
 - y. All symbols used by Schneider Electric EcoBuilding Business in the creation of graphic pages shall be saved to a library file for use by the owner.
- I. Automatic monitoring
 1. The software shall allow for the automatic collection of data and reporting from any controller or NSC. The frequency of data collection shall be user-configurable.
- J. Alarm Management
 1. The software shall be capable of accepting alarms directly from NSCs or controllers, or generating alarms based on evaluation of data in controllers and comparing to limits or conditional equations configured through the software. Any alarm (regardless of its origination) will be integrated into the overall alarm management system and will appear in all standard alarm reports, be available for operator acknowledgment, and have the option for displaying graphics, or reports.
 2. Alarm management features shall include:
 - a. A minimum of 1000 alarm notification levels at the NSC, workstation, and webstation levels. At the Enterprise level the minimum number of active and viewable alarms shall be 10,000. Each notification level will establish a unique set of parameters for controlling alarm display, distribution, acknowledgment, keyboard annunciation, and record keeping.

- b. Automatic logging in the database of the alarm message, point name, point value, source device, timestamp of alarm, username and time of acknowledgement, username and time of alarm silence (soft acknowledgement).
 - c. Playing an audible sound on alarm initiation or return to normal.
 - d. Sending an email page to anyone specifically listed on the initial occurrence of an alarm. The ability to utilize email paging of alarms shall be a standard feature of the software using Simple Mail Transfer Protocol (SMTP) with support for secure email using Simple Mail Transfer Protocol Secure (SMTPS) No special software interfaces shall be required and no email client software must be running in order for email to be distributed. The email notification shall be able to be sent to an individual user or a user group.
 - e. Individual alarms shall be able to be re-routed to a user at user-specified times and dates. For example, a critical high temp alarm can be configured to be routed to a Facilities Dept. workstation during normal working hours (7am-6pm, Mon-Fri) and to a Central Alarming workstation at all other times.
 - f. An active alarm viewer shall be included which can be customized for each user or user type to hide or display any alarm attributes.
 - g. The active alarm viewer can be configured such that an operator must type in text in an alarm entry and/or pick from a drop-down list of user actions for certain alarms.
 - h. The active alarm viewer can be configured such that an operator must type in text in an alarm entry and/or pick from a drop-down list of causes for certain alarms. This ensures accountability (audit trail) for the response to critical alarms.
 - i. The active alarm viewer can be configured such that an operator must confirm that all of the steps in a check list have been accomplished prior to acknowledging the alarm.
 - j. The active alarm viewer shall, if filtered, show the quantity of visible and total number of alarms that are not equal to 'normal' and the quantity of disabled and hidden alarms.
 - k. The alarm viewer can be configured to auto hide alarms when triggered.
 - l. An operator shall have the capability to assign an alarm to another user of the system.
 - m. Time schedules shall be able to be used to set control notifications to users.
 - n. An operator shall have the capability to save and apply alarm favorites.
 - o. Alarm notifications must support multiple distribution methods within one notification.
- K. Report Generation
- 1. The Reports Server shall be able to process large amounts of data and produce meaningful reports to facilitate analysis and optimization of each installation.
 - 2. Reports shall be possible to generate and view from the operator Workstation, and/or Webstation, and/or directly from a reports-only web interface.
 - 3. A library of predefined automatically generated reports that prompt users for input prior to generation shall be available. The properties and configurations made to these reports shall be possible to save as Dashboard reports, so that the configurations are saved for future used.
 - 4. It shall be possible to create reports standard tools, such as Microsoft Report Builder 2.0 or Visual Studio, shall be used for customized reports.
 - 5. Additional reports or sets of reports shall be downloadable, transferrable, and importable
 - 6. All reports shall be able to be set up to automatically run or be generated on demand.
 - 7. Each report shall be capable of being automatically emailed to a recipient in Microsoft Word, Excel, and/or Adobe .pdf format.
 - 8. Reports can be of any length and contain any point attributes from any controller on the network.
 - 9. Image management functionality shall be possible to enable the system administrators to easily upload new logos or images to the system.
 - 10. It shall be possible to run other executable programs whenever a report is initiated.

11. Report Generator activity can be tied to the alarm management system, so that any of the configured reports can be displayed in response to an alarm condition.
12. Minimum supplied reports shall include:
 - a. Activities Per Server Report
 - b. Activities Per User Report
 - c. Alarm Amount by Category Report
 - d. Alarm Amount by Type Report
 - e. Alarms Per Sever Report
 - f. Current Alarm Report
 - g. Most Active Alarm Report
 - h. System Errors Per Server Report
 - i. Top Activities Report
 - j. Top Alarms Report
 - k. Top System Errors Report
 - l. Trend Log Comparison Report
 - m. User Logins Report
 - n. Users and Groups Reports
13. Minimum Energy Reports shall include:
 - a. Energy Monitoring Calendar Consumption Report: Shall provide an interactive report that shows the energy usage on one or multiple selected days.
 - b. Energy Monitoring Consumption Breakdown Report: Shall provide a report on energy consumption broken down using sub-metering.
 - c. Energy Monitoring Consumption Report: Shall show the energy consumption against a specified target value.
14. Reports Server Hardware Requirements
 - a. Processor
 - 1) Minimum: 2.0 GHz
 - 2) Recommended: 2.0 GHz or higher
 - b. Memory
 - 1) Minimum: 6 GB
 - 2) Recommended: 8GB or higher
 - c. Hard Disk: 500 GB
15. Reports Server Software Requirements
 - a. Operating System:
 - 1) Microsoft Windows 8.1 32-bit (Pro or Enterprise)
 - 2) Microsoft Windows 8.1 64-bit (Pro or Enterprise)
 - 3) Microsoft Windows 10 64-bit (Pro or Enterprise)
 - 4) Microsoft Windows Server 2012 64-bit (Standard)
 - 5) Microsoft Windows Server 2012 R2 64-bit (Standard, Datacenter)
 - b. SQL Versions:
 - 1) Microsoft SQL Server 2008 R2 64-bit SP2 (Standard and Express with Advanced Services)
 - 2) Microsoft SQL Server 2012 64-bit (Standard and Express with Advanced Services)
 - c. Additional required software"
 - 1) Microsoft .Net 4.5

L. Scheduling

1. From the workstation or webstation, it shall be possible to configure and download schedules for any of the controllers on the network.
2. Time of day schedules shall be in a calendar style and viewable in both a graphical and tabular view.
3. Schedules shall be programmable for a minimum of one year in advance.
4. To change the schedule for a particular day, a user shall simply select the day and make the desired modifications.

5. Additionally, from the operator webstations, each schedule will appear on the screen viewable as the entire year, monthly, week and day. A simple mouse click shall allow switching between views. It shall also be possible to scroll from one month to the next and view or alter any of the schedule times.
6. Schedules will be assigned to specific controllers and stored in their local RAM memory. Any changes made at the workstation will be automatically updated to the corresponding schedule in the controller.
7. It shall be possible to assign a lead schedule such that shadow/local schedules are updated based upon changes in the Lead.
8. It shall be possible to assign a list(s) of exception event days, dates, date ranges to a schedule.
9. It shall be possible to view combined views showing the calendar and all prioritized exemptions on one screen.
10. It should accommodate a minimum of 16 priority levels.
11. Values should be able to be controlled directly from a schedule, without the need for special program logic.

M. Programmer's Environment

1. Programming in the NSC shall be either in graphical block format or line-programming format or both.
2. Programming of the NSC shall be available offline from system prior to deployment into the field. All engineering tasks shall be possible, except, of course, the viewing of live tasks or values.
3. The programmer's environment will include access to a superset of the same programming language supported in the SDCUs.
4. NSC devices will support both script programming language as well as the graphical function block programming language. For both languages, the programmer will be able to configure application software for custom program development, and write global control programs. Both languages will have debugging capabilities in their editors.
5. It shall be possible to save custom programs as libraries for reuse throughout the system. A wizard tool shall be available for loading programs from a library file in the program editor.
6. It shall be possible to view graphical programming live and real-time from the Workstation.
7. The system shall be capable of creating 'binding templates' allowing the user to bind multiple points to multiple objects all at once.
8. Key terms should appear when typing (IntelliType).
9. Applications should be able to be assigned different priorities and cycle times for a prioritized execution of different function.
10. The system shall be able to create objects that allow common objects such as power meters, VFD drives, etc. to be integrated into the system with simple import actions without the need of complicated programming or configuration setups.

N. Saving/Reloading

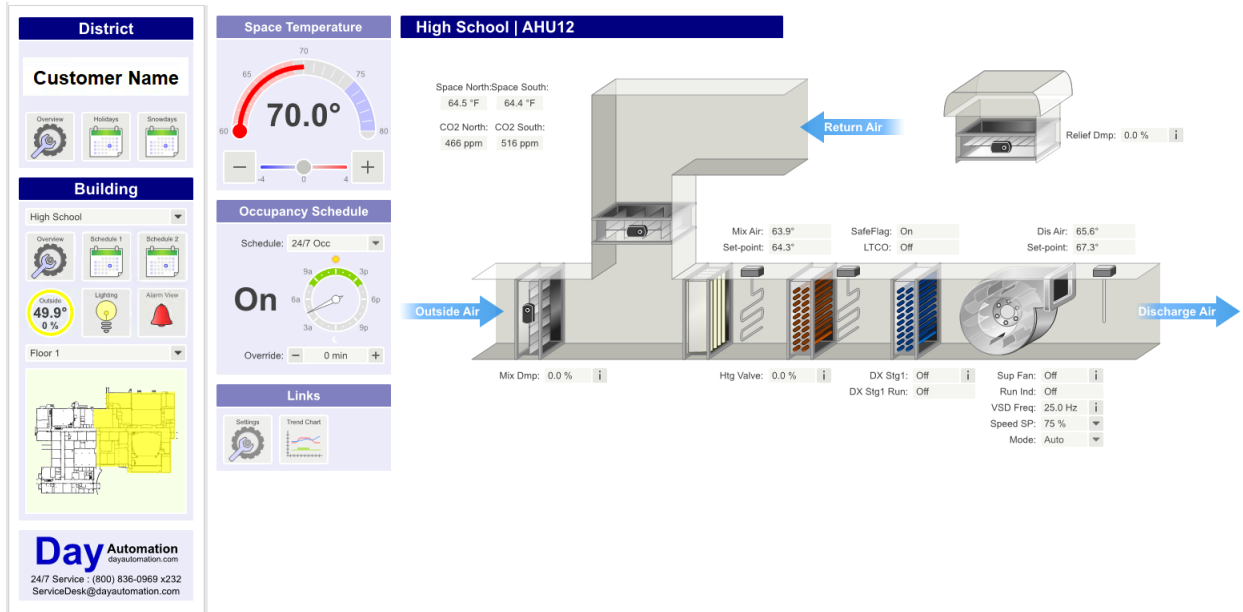
1. The workstation software shall have an application to save and restore NSC and field controller memory files.
2. For the NSC, this application shall not be limited to saving and reloading an entire controller – it must also be able to save/reload individual objects in the controller. This allows off-line debugging of control programs, for example, and then reloading of just the modified information.

O. Audit Trail

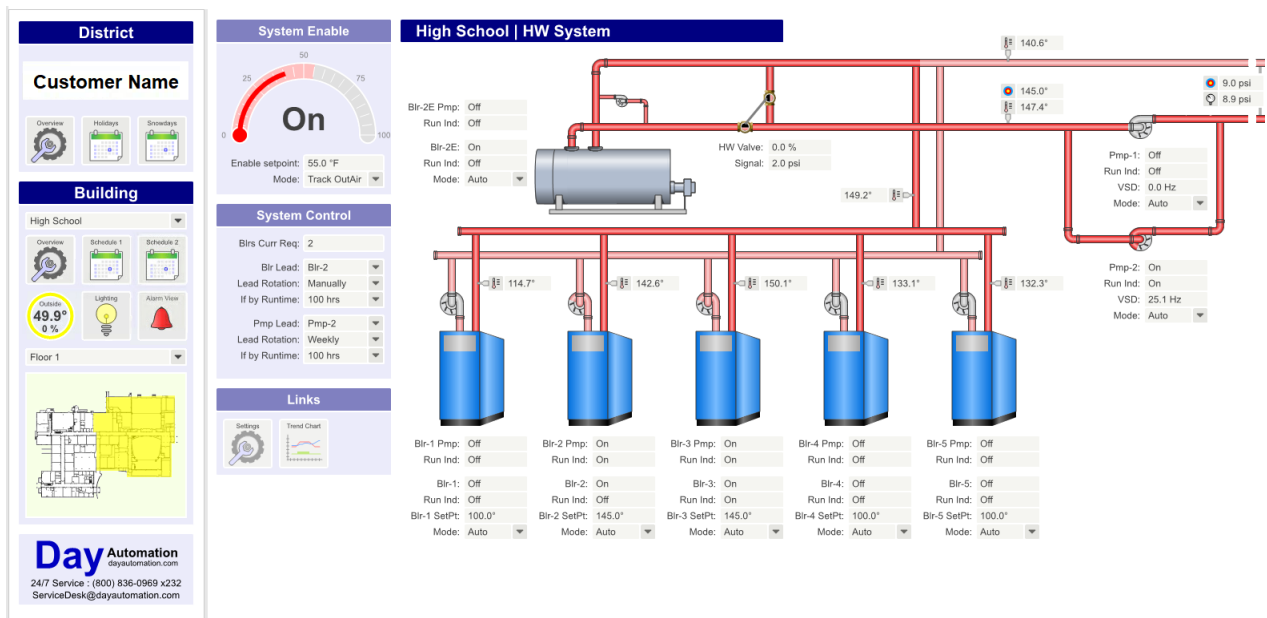
1. The workstation software shall automatically log and timestamp every operation that a user performs at a workstation, from logging on and off a workstation to changing a point value, modifying a program, enabling/disabling an object, viewing a graphic display, running a report, modifying a schedule, etc.

2. It shall be possible to view a history of alarms, user actions, and commands for any system object individually or at least the last 5000 records of all events for the entire system from Workstation.
 3. The Enterprise server shall be able to store up to 5 million events.
 4. The event view shall support viewing of up to 100,000 events.
 5. It shall be possible to save custom filtered views of event information that are viewable and configurable in Workstation.
 6. It shall be capable to search and view all forced values within the system.
- P. Fault Tolerant Enterprise Server Operation (Top level NSC)
1. A single component failure in the system shall not cause the entire system to fail. All system users shall be informed of any detectable component failure via an alarm event. System users shall not be logged off as a result of a system failure or switchover.
- Q. Web-based Operator Software
1. General:
 - a. Day-to-day operation of the system shall be accessible through a standard web browser interface, allowing technicians and operators to view any part of the system from anywhere on the network.
 - b. The system shall be able to be accessed on site via a mobile device environment with, at a minimum, access to overwrite and view system values.
 2. Graphic Displays
 - a. The browser-based interface must share the same graphical displays as the Administration and Programming Workstations, presenting dynamic data on site layouts, floor plans, and equipment graphics. The browser's graphics shall support commands to change setpoints, enable/disable equipment and start/stop equipment.
 - b. Through the browser-based interface, operators must be able to navigate through the entire system, and change the value or status of any point in any controller. Changes are effective immediately to the controller, with a record of the change stored in the system database.
 3. Alarm Management
 - a. Systems requiring additional client software to be installed on a PC for viewing the webstation from that PC will not be considered.
 - b. Through the browser interface, a live alarm viewer identical to the alarm viewer on the Administration and Programming workstation shall be presented, if the user's password allows it. Users must be able to receive alarms, silence alarms, and acknowledge alarms through a browser. If desired, specific operator text must be able to be added to the alarm record before acknowledgement, attachments shall be viewable, and alarm checklists shall be available.
- R. Groups and Schedules
1. Through the browser interface, operators must be able to view pre-defined groups of points, with their values updated automatically.
 2. Through the browser interface, operators must be able to change schedules – change start and stop times, add new times to a schedule, and modify calendars.
- S. User Accounts and Audit Trail
1. The same user accounts shall be used for the browser interface and for the operator workstations. Operators must not be forced to memorize multiple passwords.
 2. All commands and user activity through the browser interface shall be recorded in the system's activity log, which can be later searched and retrieved by user, date, or both.
- T. Web Services
1. The installed system shall be able to use web services to “consume” information within the Network Server/Controllers (NSCs) with other products and systems. Inability to perform web services within the NSCs will be unacceptable.
 - a. Shall be able to “consume” data into the system via SOAP and REST web services.

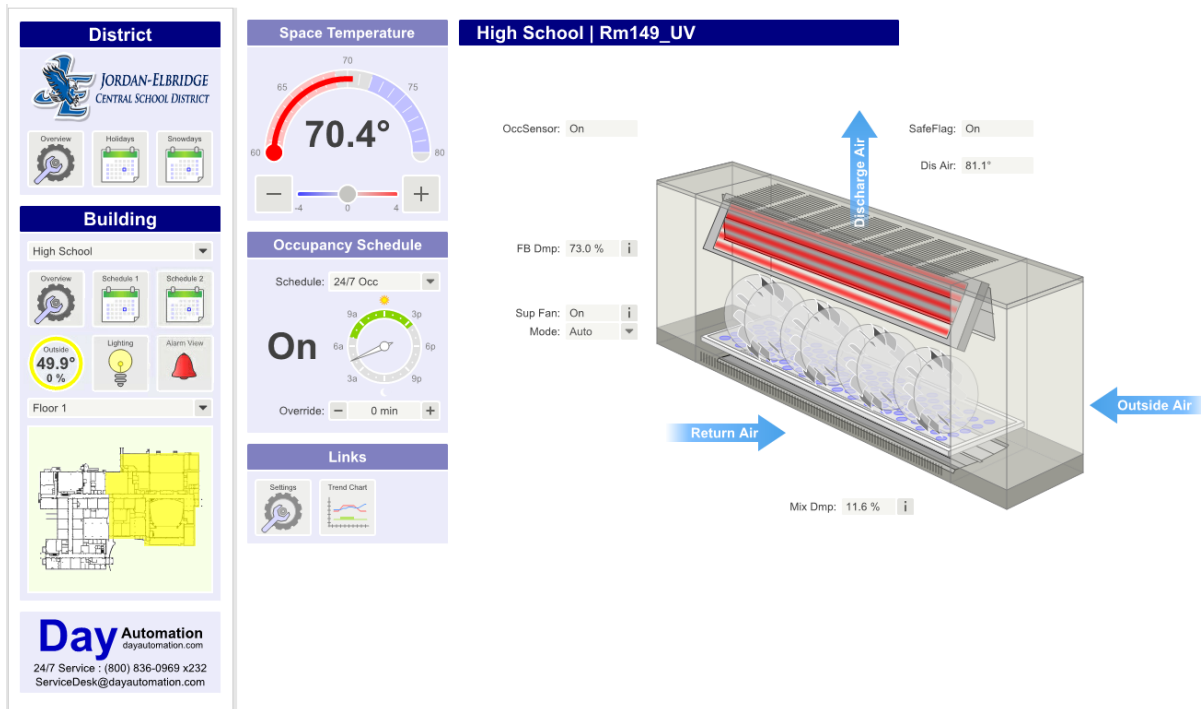
U. Sample Graphics
1. Air Handling Unit:



A. Boiler Plant:



A. Unit Ventilator:



A. Variable Air Volume Box:

District

Customer Name

Overview Holidays Snowdays

Building

High School

Overview Schedule 1 Schedule 2

Outside 49.9° 0 %

Lighting Alarm View

Floor 1

Day Automation
24/7 Service : (800) 836-0969 x232
ServiceDesk@dayautomation.com

Space Temperature

70.1°

Occupancy Schedule

On

Override: 0 min

Links

Settings Trend Chart

High School | Rm127_VAV

Airflow: 498 cfm
Set-point: 500 cfm
Mode: Auto

Dis Air: 66.5°
Set-point: 67.3°

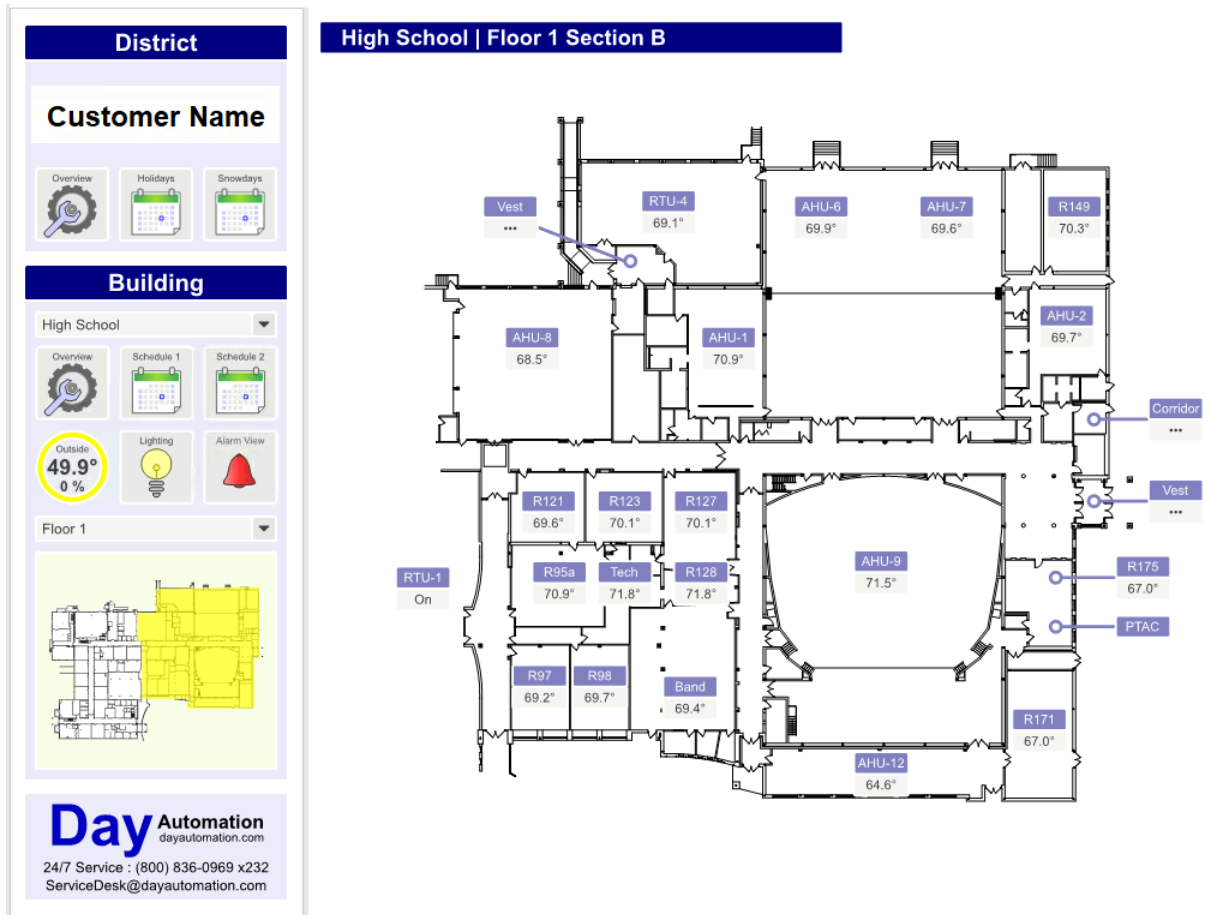
Primary Air

AHU Fan Run: On
AHU Dis Air: 60.6°
AHU Static: 0.53" wc

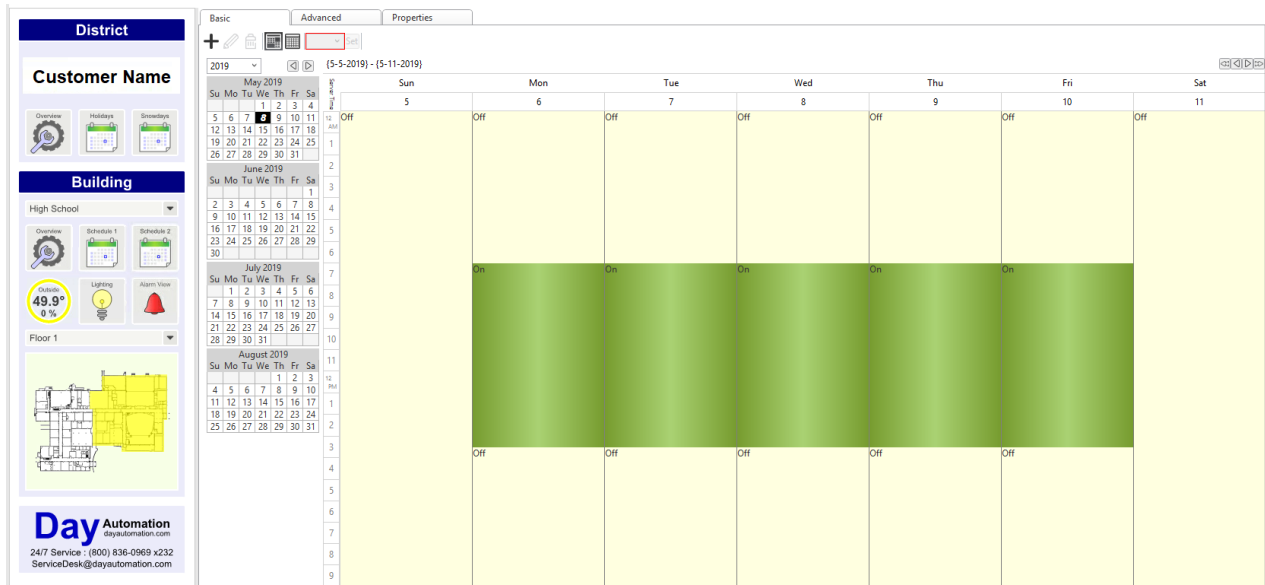
Damper: 82.9 %
Pulse: 1.00 sec

Reheat Vlv: 2.8 %

A. Sample Floor Plan:



A. Sample Schedule:



2.4 BACNET FIELDBUS CONTROLLERS

A. Controllers – BACnet/IP Protocol

1. All BACnet/IP Fieldbus controllers shall be BACnet Testing Laboratory listed (v12 or later) as specified BACnet Advanced Application Controller (B-AAC)
2. All BACnet/IP Fieldbus controllers shall use the following communication specifications and achieve performance as specified herein:
 - a. All controllers shall be able to communicate peer-to-peer without the need for an NSC.
 - b. Any BACnet/IP Fieldbus controllers on the Ethernet Data Link/Physical layer shall be able to act as a Master to allow for the exchange and sharing of data variables and messages with any other controller connected on the same communication cabling. Slave controllers are not acceptable.

B. The BACnet/IP Fieldbus controllers shall be equipped with 2x 10/100bT Ethernet communication ports with active switch and will support BACnet/IP communication protocols with the following configurations:

1. Supporting IPv4 addressing.
2. Supporting Static IP setting, DHCP client and Auto-IP address acquisition.
3. It shall be possible to disable Ethernet port 2.

C. Topologies

1. BACnet/IP Fieldbus Controllers shall support RSTP loop whereby up to 36 controllers are supported.
2. In case of any disruption there shall be no communication interruption.
3. In case of any disruption there shall be system alarms that will inform the operator of the disruption.

D. Performance

1. Each BACnet/IP Fieldbus Controllers shall have a 32-bit microprocessor operating at 500 MHz and support a BACnet protocol stack in accordance with the ANSI/ASHRAE Standard 135-2008 and the BACnet Device Profile supported.

2. They shall be multi-tasking, real-time digital control processors consisting of communication controllers, controls processing, power supplies with built-in inputs and outputs.
- E. Programmability
1. The BACnet/IP Fieldbus controllers shall support both script programming language and graphical that will be consistent with the NSC.
 2. The control program will reside within the same enclosure as the input/output circuitry, that reads inputs and controls outputs.
 3. All control sequences programmed into the BACnet/IP Fieldbus Controllers shall be stored in non-volatile memory, which is not dependent upon the presence of a battery, to be retained.
 4. BACnet/IP Fieldbus controllers shall communicate with the Network Server Controller (NSC) via a BACnet/IP connection at a baud rate of not less than 100 Mbps.
 5. BACnet/IP Fieldbus controllers shall support a dedicated communications port for connecting and supplying power to a matching room temperature and/or humidity sensor and/or CO2 and/or presence detector that does not utilize any of the I/O points of the controller.
 6. BACnet/IP Fieldbus controllers (Excluding VAV) shall support an add-on display to supply and provide access in real-time for monitoring inputs and overriding of outputs.
 7. The override functionality must be supported by a dedicated processor to assure reliable operation (overriding of output).
 8. Each BACnet/IP Fieldbus controller shall have sufficient memory, to support its own operating system and databases, including:
 - a. Control processes
 - b. Energy management applications
 - c. Alarm management
 - d. Historical/trend data
 - e. Maintenance support applications
 - f. Custom processes
 - g. Manal override monitoring
 9. Each BACnet/IP Fieldbus controller shall support local trend data up to 2x the built-in I/O and at a minimum be capable of holding 5 days @ 15 min intervals locally.
 10. The BACnet/IP Fieldbus controller analog or universal input shall use a 16 bit A/D converter.
 11. The BACnet/IP Fieldbus controller analog or universal output shall use a 10 bit D/A converter.
 12. Built-in I/O: each BACnet/IP Fieldbus controllers shall support:
 - a. At minimum 8 and up to 20 configurable IO channels to monitor and to control the following types of inputs and outputs without the addition of equipment inside or outside the DDC Controller cabinet.
 - 1) Universal Inputs – the following thermistors for use in the system without any external converters needed.
 - (a) 10 kohm Type I (Continuum)
 - (b) 10 kohm Type II (I/NET)
 - (c) 10 kohm Type III (Satchwell)
 - (d) 10 kohm Type IV (FD)
 - (e) Linearized 10 kohm Type V (FD w/11k shunt)
 - (f) Linearized 10 kohm (Satchwell)
 - (g) 1.8 kohm (Xenta)
 - (h) 1 kohm (Balco)
 - (i) 20 kohm (Honeywell)
 - (j) 2.2 kohm (Johnson)
 - (k) PT100 (Siemens)
 - (l) PT1000 (Sauter)
 - (m) Ni1000 (Danfoss)

- b. Analog inputs
 - 1) Current Input - 0-20 mA
 - 2) Voltage Input 0-10 Vdc
- c. Digital inputs from dry contact closure, pulse accumulators, voltage sensing.
- d. Digital outputs
- e. Analog outputs of 4-20 mA and/or 0-10 Vdc
- 13. Real Time Clock (RTC):
 - a. Each BACnet/IP Fieldbus controller shall include a real time clock, accurate to +/-1 minute per month. The RTC shall provide the following: time of day, day, month, year, and day of week.
 - b. The RTC date and time shall also be accurate, up to 7 days, when the BACnet/IP Fieldbus controller is powerless.
 - c. No batteries may be used to for the backup of the RTC.
- 14. The BACnet/IP Fieldbus controller for Variable Air Volume (VAV) applications
 - a. The BACnet/IP Fieldbus controller for VAV applications shall include a built-in 'flow thru' differential pressure transducer.
 - b. The VAV differential pressure transducer shall have a measurement range of 0 to 1 in. W.C. and measurement accuracy of $\pm 5\%$ at 0.001 to 1 in. W.C. and a minimum resolution of 0.001 in. W.C., ensuring primary air flow conditions shall be controlled and maintained to within $\pm 5\%$ of setpoint at the specified minimum and maximum air flow parameters.
 - c. The BACnet/IP Fieldbus controller for VAV applications shall support a dedicated commissioning tool for air flow balancing
 - d. The BACnet/IP Fieldbus controller for VAV applications shall require no programming for air balancing algorithm.
 - e. All balancing parameters shall be synchronized in NSC.
- 15. Each BACnet/IP Fieldbus controller shall have a minimum of 10% spare capacity for each point type represented on the controller for future point connection.
- 16. Power Requirements.: 24VDC (21 to 33 VDC) and 24 VAC +/-20% with local transformer power.
- F. Commissioning Tool - The BACnet/IP Fieldbus controller shall be supported via a dedicate mobile based commissioning tool for configuration, programming, air balancing and I/O checkout
 - 1. The Commissioning Tool shall be supported across: iOS, Android and Windows 10 platforms
 - 2. The Commissioning Tool shall be available for download on App Store, Google Store and Windows Store
 - 3. Commissioning Tool Interface to BACnet/IP Fieldbus controllers shall be via a Bluetooth adapter interface through the Intelligent Space Sensor or via a Wi-Fi access point on the LAN
 - 4. Functionality
 - a. Device Configuration – the Commissioning Tool shall be able to set or edit all Network configurations associated with the BACnet/IP Fieldbus controller
 - b. Programming – The Commissioning Tool shall be able to load offline engineered applications directly into the controller directly
 - c. Air Balancing:
 - 1) The Commissioning Tool shall allow the air balancer to manually control the action of the actuator including the following function: open VAV damper, close VAV damper, open all VAV dampers, and close all VAV dampers.
 - 2) The Commissioning Tool shall be able to generate Air Balancing report
 - d. IO Checkout
 - 1) The Commissioning Tool shall be able to support overriding of the outputs and reading value of inputs live
 - 2) The Commissioning Tool shall be able to support generation of I/O checkout report

- e. There shall be no limit to the number of Commissioning Tools that can be used on a network segment, however, one connection per controller is recommended
- G. Intelligent Space Sensors - The BACnet/IP Fieldbus controller shall support a dedicated RJ45 communication port to communicate and power up to 4 intelligent wall mount sensors without the use of on-board inputs or outputs
 - 1. The Intelligent Space Sensor shall communicate with the BACnet/IP Fieldbus controller through the sensor port and via category 5 or category 6 cable
 - 2. The Intelligent Space Sensor shall provide 2 RJ45 communication ports that will allow communication with parent BACnet/IP Field controller upstream and additional Intelligent Space Sensors downstream
 - 3. The Intelligent Space Sensor shall provide ambient space condition sensing without the use of hardware I/O
- H. Each Intelligent Space Sensor shall provide a color touch display with:
 - 1. Minimum 61 mm (2.4") by 61 mm (2.4") display
 - 2. Backlit
- I. The Intelligent Space Sensor shall be capable of displaying measured space temperature from 0 to 50 °C (32 to 122 °F) with accuracy of ± 0.2 °C (± 0.4 °F) selectable for 0.1 or 1 degree display resolution of °F or °C
 - 1. Sensing Element: 10k Type 3 Thermistor
 - 2. Accuracy of ± 0.2 °C (± 0.4 °F)
 - 3. Resolution: 0.1 or 1 degree display resolution
 - 4. Range: 0 to 50 °C (32 to 122 °F)
- J. The Intelligent Space Sensor shall have the option for humidity sensor support sensing humidity from 0 % RH to 100 % RH Digital humidity indication (selectable for 0.1 or 1% RH with selectable display resolution of 0.1 or 1 % RH)
 - 1. Accuracy: ± 2 % RH
 - 2. Resolution: 0.1 or 1 % RH
 - 3. Range: 0 % RH to 100 % RH
- K. The Intelligent Space Sensor shall have the option for support of CO2 sensor with display resolution with 0 to 2000 ppm resolution
 - 1. Accuracy: ± 30 ppm $\pm 2\%$ of measured value
 - 2. Range: 0 to 2,000 ppm
 - 3. Operating elevation: 0 to 16,000 ft.
 - 4. Temperature dependence: 0.11% FS per °F
 - 5. Stability: <2% of FS over life of sensor (15 years)
 - 6. Sensing method: Non-dispersive infrared (NDIR), diffusion sampling
- L. The Intelligent Space Sensor shall have the option for motion sensor
- M. Display options: The Intelligent Space Sensor shall be capable of displaying the following elements:
 - 1. Space temperature
 - 2. Cooling space temperature set point
 - 3. Heating space temperature set point
 - 4. Current heating or cooling mode
 - 5. Current occupancy mode
 - 6. Fan speed
 - 7. Current time
- N. Commissioning Tool Interface – the Intelligent Space Sensor shall support a Bluetooth adaptor interface to allow connectivity of a commissioning tool.

2.5 DDC SENSORS AND POINT HARDWARE

- A. General: Where indicated on the drawings, schedules or sequence of operations, provide equipment that conforms to the following specifications:
- B. Temperature Sensors:
1. All temperature devices shall use precision thermistors accurate to $\pm 0.36^{\circ}\text{F}$ over a range of -30 to 230°F .
 2. Standard space sensors shall be provided in an off-white enclosure for mounting on a standard electrical box.
 3. Where manual override of unoccupied mode of control is indicated on the drawings or sequence of operation, provide a push button for selecting after hours operation.
 4. Where manual adjustment to the setpoint is indicated on the drawings or sequence of operation, provide slider with \pm programmable scale
 5. Where a local display is indicated on the drawings or sequence of operation, the sensor shall incorporate LCD display for viewing the space temperature.
 6. Where digital setpoint adjustment and/or other operator selectable parameters are indicated on the drawings or sequence of operation, provide a sensor with built in buttons and digital display. The sensor shall be programmable to provide custom function as specified.
 7. Duct temperature sensors shall incorporate a thermistor bead embedded at the tip of a stainless-steel tube. Probe style duct sensors shall be used in air handling applications where the air stream temperature is consistent and is not stratified.
 8. Averaging sensors shall be employed in all mixing plenum applications and in any other application where the temperature might otherwise be stratified. The averaging sensor tube shall contain at least four thermistor sensors.
 9. Immersion sensors shall be employed for measurement of temperature in all chilled water, hot water and glycol applications. Thermal wells shall be brass or stainless steel for non-corrosive fluids below 250 degrees F and 300 series stainless steel for all other applications.
- C. Humidity Sensors:
1. Humidity sensors shall be polymer resistance type.
 2. Space humidity sensors shall have a sensing range of 05 to 95% with accuracy of $\pm 2\%$ RH.
 3. Duct sensors and Outdoor air humidity sensors shall have a sensing range of 05 to 95% RH with accuracy of $\pm 3\%$ RH. Sensors shall be suitable for ambient temperature conditions of -40 to 212°F .
 4. Equipment shall be able to demonstrate that accuracy is NIST traceable calibration.
- D. Pressure Sensors:
1. Air pressure or differential air pressure measurements in the range of 0 to 10" water column shall be accurate to $\pm 1\%$ of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Acceptable manufacturer shall be Schneider model EPU305.
 2. Liquid pressure or differential liquid pressure measurements shall be accurate to $\pm 0.25\%$ of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Unit shall be provided with isolation and bypass manifold for start-up and maintenance operations. Acceptable manufacturer shall be Schneider model EPWR420-LCD.
 3. Steam pressure measurements shall be accurate to $\pm 0.13\%$ of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Unit shall be provided with isolation and bypass manifold for start-up and maintenance operations. Acceptable manufacturer shall be Setra model C-207.
- E. Airflow Probes:

1. Provide an array of airflow traverse probes where indicated, capable of continuously monitoring the fan or duct capacities (CFM) they serve. Each airflow traverse probe shall contain multiple total and static pressure sensors located along the exterior surface of the cylindrical probe and internally connected to their respective averaging manifolds. The flow sensors shall not protrude beyond the surface of the probe(s) and shall be the offset type for static pressure and the chamfered impact type for total pressure measurement. The airflow sensing probe's measurement accuracy shall not be affected by directional flow having pitch and/or yaw angles up to 30°. Each airflow traverse probe shall be of extruded aluminum construction and furnished with mounting plate(s), gasket and signal fittings suitable for HVAC duct installation.
 2. The airflow traverse probe shall not induce a pressure drop in excess of 0.03" w.c. at 2000 FPM, nor measurably contribute to sound levels within the duct. Total and static pressure sensors shall be located at the centers of equal areas (for rectangular duct) or at equal concentric area centers (for circular ducts) along the probe length. The airflow traverse probe shall be capable of producing steady, non-pulsating signals of total and static pressure without need for flow corrections or factors, with an accuracy of 2-3% of actual flow, over a velocity range of 400 to 4000 FPM.
 3. Provide the minimum number of probes indicated: Duct height 8 – 12", 1 probe; 13 – 30", 2 probes; 31 – 54", 3 probes; 55 – 84", 4 probes; 85 – 120", 5 probes; 121 – 180", 6 probes.
 4. The airflow traverse probe shall be the VOLU-probe as manufactured by Air Monitor Corporation, or equivalent.
- F. Liquid Flow Measurement:
1. Hi Liquid flow measurement devices shall be accurate to +/- 0.75% over a turn down ratio of 10:1. Insertion probe sensing element shall be made of 316l stainless steel. The sensing element shall have an elliptical shape that eliminates the separation point at a fixed or variable location ahead of the static pressure pick up point. Device shall only require one welded insert to mounted to piping system. Acceptable manufacturer shall be Preso, model BAR.
- G. High Limit Thermostats:
1. High limit thermostats shall be located as directed and shall be manual reset type set at 120°F in the return and 180°F in the discharge. Thermostats shall be double pole so as to provide input capability for alarm at the BAS.
- H. Low Limit Thermostats:
1. Safety low limit thermostats shall be vapor pressure type with a 20-foot minimum element. Element shall respond to the lowest temperature sensed by any one-foot section. Provide one thermostat for each 25 square foot of coil area.
 2. Low limit thermostat shall be manual reset and shall be double pole so as to provide input capability for alarm at the BAS.
- I. Current Sensing Status Switches:
1. Current status switches shall be used to monitor the run status of fans, pumps, motors and electrical loads. Acceptable manufacturer is Veris or approved equal.
- J. Current Measurement Devices:
1. Measurement of three-phase power shall be accomplished with a kW/kWh transducer. The instrument shall utilize direct current transformer inputs to calculate the instantaneous value (kW) and a pulsed output proportional to the energy usage (kWh). Provide Veris Model 6000 Power Transducer or approved equal.
- K. Carbon Monoxide and Carbon Dioxide Sensing Devices:
1. Space or duct mounted carbon dioxide (CO₂) sensor shall be a dual element thermally compensated Lithium Tantalate IR detector and shall contain an on board relay with field adjustable trip point and adjustable time delay. The sensor shall monitor CO₂ over a range of 0 – 3000 PPM, have an accuracy of +/-3% and operate within the range of 32-104°F and 0-95% RH. The sensor shall have a calibration accuracy of 0.5%, a

- repeatability of no more than ± 20 PPM and a drift of no more than $\pm 2\%$. The sensor shall have a green LED for normal operation, and a red LED for relay, and a reset button. Where required by the drawings or specifications, provide an LCD display for displaying PPM level and field adjustable settings. Veris Product # CWE or equivalent.
2. Wall mounted carbon monoxide (CO) sensor shall be microprocessor based (12-bit accuracy) and shall monitor CO over a range of 0-300 PPM (optional 200-500 PPM). The device shall have an accuracy of $\pm 3\%$ (electrochemical type) or $\pm 5\%$ (solid state type) and operate within the range of 32-122°F and 0-95% RH. The sensor shall have a calibration accuracy of 0.5%. Where required by the drawings or specifications, provide an LCD display for displaying PPM level and system configuration information and/or audible alarm with programmable trip point and disable jumper. Dwyer Product # GSTA-C-Dor equivalent.
- L. Refrigerant Loss Monitor
1. Provide infrared refrigerant loss monitor to allow compliance with ASHRAE 15. Monitor shall detect all halogen based refrigerants, and refrigerant types shall be field changeable without recalibration. Monitor shall provide continuous digital display of system status and shall provide analog output for remote monitoring. Provide system malfunction detection and indication, and visual alarm indication. SenTech Series IR-SNIF or equivalent.
- M. Pneumatic Digital Transducers:
1. Device shall provide a pneumatic output proportional to an analog output signal generated by the computer controller. Software algorithms shall compute the position of the actuator and the actuator shall be adjusted to that position. "Bleed Feed" Transducers that do not respond proportionally to a computed proportional output of the computer are not acceptable.
 2. Device shall fail to Zero PSI on power or signal failure
 3. Device shall use no air at steady state output position
 4. Device shall be provided with Zero and Span adjustment and Manual override positioning capability.
 5. Device shall be capable of generating a 0 to 10Vdc analog output proportional to pneumatic output
- N. Control Valves:
1. Provide automatic control valves suitable for the specified controlled media (steam, water or glycol). Provide valves that mate and match the material of the connected piping.
 2. Control valves shall meet the heating and cooling loads specified, and close off against the differential pressure conditions within the application. Valves should be sized to operate accurately and with stability from 10 to 100% of the maximum design flow. Valves shall be selected to provide an initial pressure drop of not more than 4 psig for water applications. For low pressure steam application, the pressure drop shall be equal to the supply pressure minus the heating element design inlet pressure.
 3. Trim material shall be stainless steel.
 4. Actuators on all control valves shall be spring return to normal position pneumatic unless specifically stated otherwise. Actuators shall be sized to retain offset between nominal and actual spring range to 1.5 PSI.
 5. Normal position of both heating and cooling valves shall be open. Three Way valves shall be piped to fail open to both heating and cooling.
 6. Pneumatic actuators for two position radiation control, isolation of unit heaters or cabinet heaters shall be 2" diameter.
 7. For all other control valves, the pneumatic actuator shall be nominal 4" in diameter or larger as required to conform with nominal to actual spring range shift tolerance specified.
 8. Electric Bi-Directional actuators are acceptable on VAV Terminal Units and Reheat coil valve control if so noted.
 9. All electric actuators for applications other than VAV terminal units and Reheat Coil valve Control shall be Proportional analog 4-20Ma or 0-10Vdc input and shall be positioned to

reflect the output value of the computer control system and shall be spring return to normal position.

- O. Dampers:
 - 1. Automatic dampers furnished by the Building Automation Contractor shall be single or multiple blade as required. Dampers shall be installed by the HVAC Contractor under the supervision of the BAS Contractor. All blank-off plates and conversions necessary to install smaller than duct size dampers are the responsibility of the Sheet Metal Contractor.
 - 2. Damper frames shall be hat shaped channel, 4" deep constructed of 16-gauge galvanized steel. Stainless steel side seals, and sintered bronze, oil-impregnated bearings shall also be provided.
 - 3. Damper blades shall be 16-gauge galvanized steel and shall be 6" on center. Provide vinyl-grip seals on blades.
 - 4. Provide damper linkage that consists of 0.50" diameter steel, cadmium plated, and chromate treated pivots. Provide a ¼-20 set-screw with a locking-patch to lock the pivots to a 0.31 diameter aluminum rod. Pivots shall rotate in a Celcon bearing. Blade brackets shall be 12-gauge cadmium plated steel. Blades shall be individually factory adjusted for maximum shut off.
 - 5. Provide axles that are steel, 0.350" diameter cadmium plated and driveshafts that are ½" diameter cadmium plated steel, extendable 6".
 - 6. For high performance applications, control dampers shall meet or exceed the UL Class I leakage rating.
 - 7. Control dampers shall be Ruskin, Arrow or approved equal.
 - 8. Unless otherwise noted, provide opposed blade dampers for modulating applications and parallel blade for two-position control.
- P. Electric Thermostats: Provide a low voltage thermostat for control of single zone heating and air conditioning unit as specified in the sequence of operation. Electric thermostats shall include a display of the current space temperature as well as a mechanism for adjusting the setpoint locally. Aquastats on unit heaters shall stop the fan when the water temperature is below 100°F. The control contractor may provide full DDC control of the unit heaters in lieu of electric thermostats and use the global water temperature for low temperature interlock if it is offered at no change in price.
- Q. Steam Flow Measuring- Yokagawa Vortex Shedding Flow Meter per application.
- R. Hot or Chilled Water Flow Measuring- Onicon Electromagnetic Meters, F-3500 series.

PART 3 – EXECUTION

3.1 CONTRACTOR RESPONSIBILITIES

- A. General: Installation of the building automation system shall be performed by the Temperature Controls Contractor or a Subcontractor. However, all installation shall be under the personal supervision of the Temperature Controls Contractor. The Temperature Controls Contractor shall certify all work is proper and complete. The design, scheduling, coordination, programming, training, and warranty requirements for the project be performed by the Temperature Controls Contractor.
- B. Demolition: Remove controls which do not remain as part of the building automation system, including all associated abandoned wiring, conduit, and pneumatic tubing. The Owner will inform the Contractor of any equipment that is to be removed that will remain the property of the Owner. This equipment shall be handled with care so as not to damage it. All other equipment that is removed shall be disposed of by the Contractor.
- C. Cleanup: At the completion of the work, all equipment pertinent to this section shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment

provided under this section. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.

3.2 WIRING, CONDUIT AND CABLE

- A. ALL wiring (high voltage, 50 volts and greater) and conduit is to be installed in accordance with local and national electrical codes and Division 26 (Electrical division) specification.
 - 1. All temperature control cable less than 50 volts is to be considered low voltage.
 - 2. All low voltage cable is to be run in conduit in any non-accessible concealed space and within mechanical rooms. Wiring above 10 ft or within accessible areas (ceilings, crawl spaces) may be run exposed with proper support with bridle rings. Wiring is to be run parallel and perpendicular to building lines in a neat and workmanlike manner and bundled with nylon tie wraps.
 - 3. Conduit sleeves shall be run through any concrete or block walls for low voltage cable to be run through such walls.
 - 4. All low voltage cable shall be run separate from high voltage cable. All microprocessor communications cable shall be run separate from any low or high voltage cable.
 - 5. All runs of multi-conductor low voltage wiring shall have at least one pair of spare conductors.
 - 6. Any cable running in plenum rated areas shall be plenum rated cable.
 - 7. Infinet and BacNET communication wiring shall be Cardinal Supply PN F2401-L120 or Connect Air PN W241P-2050FRIB.
 - 8. BacNET IP communication wiring shall be Schneider PN ACT4P6UCP1ARXGR.
 - 9. Sensor wiring shall be 300 Volt 18 Ga. Min., Twisted, Stranded, 2-Conductor Plenum Rated Wiring. Cardinal Supply PN D1801 or equivalent.
 - 10. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.
 - 11. Fiber optic cable shall include the following sizes; 50/125, 62.5/125 or 100/140.
 - 12. Only glass fiber is acceptable, no plastic will be allowed.
 - 13. Fiber optic cable shall only be installed and terminated by an experienced contractor.
 - 14. Wires and tubing shall be installed a minimum of three (3) inches from hot water, steam, or condensate piping.
 - 15. A true earth ground shall be available in the building. Ground shall be run from the source electrical panel ground to each temperature control panel or controller.
 - 16. Metallic surface raceway may be used in finished areas on non accessible masonry walls AS APPROVED BY OWNER AND/OR ARCHITECT/ENGINEER. All surface raceway in finished areas shall be color matched to the existing finish within the limitations of standard manufacturer's colors.

3.3 SENSOR AND ENCLOSURE LOCATIONS

- A. The location of sensors is per mechanical and architectural drawings.
- B. Space humidity or temperature sensors will be mounted away from machinery generating heat, direct light and diffuser air streams.
- C. Outdoor air sensors will be mounted on the north building face directly in the outside air. Install these sensors such that the effects of heat radiated from the building or sunlight is minimized.
- D. Field enclosures shall be located immediately adjacent to the controller panel(s) to which it is being interfaced.

3.4 HARDWARE INSTALLATION

- A. Installation Practices for Field Devices:
 - 1. Actuators shall be firmly mounted to give positive movement, and linkage shall be adjusted to give smooth continuous movement throughout 100 percent of the actuator stroke.

2. Actuators shall be stroked ~5%, tightened and returned to normal position to give a positive seal.
3. Relay outputs shall include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.
4. Water line mounted sensors shall be removable without shutting down the system in which they are installed.
5. For duct static pressure sensors, the high-pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low-pressure port shall be left open to the plenum area at the point that the high-pressure port is tapped into the ductwork.
6. For building static pressure sensors, the high-pressure port shall be inserted into the space via a metal tube. The low-pressure port shall be piped to the outside of the building.

B. Enclosures:

1. For all I/O requiring field interface devices, these devices where practical shall be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure that protects the device(s) from dust and moisture and conceals integral wiring and moving parts.
2. FIPs shall contain power supplies for sensors, interface relays and contactors, safety circuits, and I/P transducers.
3. The FIP enclosure shall be of steel construction with baked enamel finish, NEMA 1 rated with a hinged door and keyed lock. All locks shall be keyed identically.
4. All outside mounted enclosures shall meet the NEMA-4 rating.
5. Provide all FIP locations on as built drawings. Drawings shall indicate FIP location, panel number and where power is being supplied from.
6. Provide adhesive label on all FIP panels indicating where source power panel originates from and number of circuit breaker.
7. FIP enclosure shall have Arc Flash covers on all circuits over 120 volts.
8. All FIPs located above and in concealed accessible locations shall have a marking sticker indicating a panel is above the acoustical dropped ceiling or access panel.
9. Mount FIPs in locations where door on FIP can be opened completely to allow access to panel components.

3.5 SOFTWARE INSTALLATION

- A. General: The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third-party software necessary for successful operation of the system.
- B. Database Configuration: The Contractor shall provide all labor to configure those portions of the database that are required by the point list and sequence of operation.
- C. Graphic user interface: Unless otherwise directed by the owner, the Contractor shall provide color graphic displays as depicted in the schematic drawings for each system and floor plan. For each system or floor plan, the display shall contain the associated points identified in the point list and allow for setpoint changes as required by the owner.

3.6 EXISTING CONTROL DEVICES

- A. The bid for the control work shall be based on the premise that existing control devices (i.e. valves & damper operators) are operational and are not in need of repair or replacement, unless otherwise noted.
 1. This contractor shall notify the Owner's Representative of existing control devices that need to be replaced or repaired that may be noticed in the process of installation of new work.

3.7 COMMISSIONING AND SYSTEM STARTUP

- A. Point to Point Checkout: Each I/O device (both field mounted and those located in FIPs) shall be inspected and verified for proper installation and functionality. A checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager for submission to the owner or owner's representative.
- B. Controller and Workstation Checkout: A field checkout of all controllers and front-end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software. A checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the owner or owner's representative by the completion of the project.
- C. System Acceptance Testing:
 - 1. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, and that any special features work as intended. Submit a Test Results Sheet to the owner.
 - 2. Perform an operational test of each third-party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information.

END OF SECTION

SECTION 23 09 93
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.
- B. Sequence of operation for:
 - 1. Air terminal units.
 - 2. Time Schedule Programs
 - 3. Alarm Points.
 - 4. Optimum start-stop.
 - 5. Setbacks
 - 6. Maintenance Management
 - 7. Scheduling
 - 8. Rooftop Unit (Heating, Cooling, Ventilating)
 - 9. DOAS Unit (Dedicated Outdoor Air System)
 - 10. Exhaust Fan Control
 - 11. Kitchen Make-Up Air Unit.
 - 12. Heating coils.

1.2 RELATED REQUIREMENTS

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.

1.3 SUBMITTALS

- A. See Section 01 30 00 - 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. Effects of power or equipment failure with all standby component functions.
 - j. Sequences for all alarms and emergency shut downs.
 - k. Seasonal operational differences and recommendations.
 - l. 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. Point description; such as dry bulb temperature, airflow, etc.
 4. Display unit.
 5. Control point or setpoint (Yes / No); i.e. a point that controls equipment and can have its setpoint changed.
 6. 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.
 7. 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.
 8. 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.

1.4 QUALITY ASSURANCE

- A. Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the State of New York.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 TIME SCHEDULE PROGRAMS

- A. The programs for the EMS shall schedule each systems operation on an hourly basis controlled through daily, weekly and/or monthly schedules. Schedules for each individual system, room or area shall be easily programmed and modified by the user on a calendar-like display at the host computer.

- B. The programs shall store 60 months of schedules.
- C. An internal time clocks shall automatically compensate for daylight savings time and calendars generated by software shall automatically compensate for leap years.

3.2 ALARM POINTS

- A. All temperature inputs to the DDC system (space, return air, mixed air, discharge air) shall be alarmed at the host computer if the temperature is out of range 10° F. (adj.) above or below setpoint.
- B. Fan status shall be monitored by a current sensing switch or differential pressure switch. If the fan is scheduled to run and the status is not proven, an alarm condition shall be shown at the host computer.
- C. Other alarm points are specifically addressed per individual sequences of operation.
- D. All points can be individually alarmed as required by owner's staff.

3.3 OPTIMUM START PROGRAM

- A. Each system shall have independent modular program.
- B. The program shall minimize the total energy consumption during daily start-up of each heating/cooling system.
- C. A control algorithm shall compare the outside air temperature to space temperature to calculate start time for each air handling system.
- D. The start time for each system shall bring its respective zone to occupied setpoint at the time of occupied mode start.
- E. The optimum start program shall be adjustable to the rate structure of the local energy company.

3.4 OPTIMUM STOP PROGRAM

- A. Each system shall have independent modular program.
- B. The program shall minimize the total energy consumption during daily shut-down of each heating/cooling system. A control algorithm shall compare the outside air temperature to space temperature to calculate a stop time for each air handling system. At no time shall the unit be shut down while a space is occupied.
- C. The stop time for each system shall shut-down its respective zone as early as possible without letting the temperature drift out of the specified comfort range.

3.5 DAY/NIGHT SETBACK

- A. The day/night setback will consist of lowering the space heating setpoint and raising the space cooling setpoint during the unoccupied mode, thereby reducing the heating and cooling energy requirements. The occupied and unoccupied areas will be specified by the owner, and will be coordinated with the control system. The setback shall be 55 degrees F in the heating mode and 85 degrees F in the cooling mode per the applicable Energy Code of the State of New York. The occupied heating set point shall be 70 and the occupied cooling setpoint will be 76.

3.6 MAINTENANCE MANAGEMENT

- A. The control system will continuously totalize hours for selected equipment controlled and/or monitored for use by the maintenance management program.

3.7 EQUIPMENT SCHEDULING

- A. Equipment shall be 7 days, 24 hours schedules with separate holiday hours.
- B. There shall be capability for five different holiday schedules which can be selected from the occupancy schedule graphic.
- C. Holidays shall be programmed so that they shall need a minimum of manual adjustment year to year, and can easily be modified at front end if necessary.
- D. All schedule programming shall reside in local controllers, but shall be configurable from the front end.

3.8 ROOFTOP UNIT (REHEAT, COOLING, VENTILATING)

- A. General:
 - 1. Unit automatically indexed to "occupied" or "unoccupied" cycle by the DDC.
 - 2. Unit automatically switches from heating to cooling modes.
- B. Heating Mode:
 - 1. Occupied cycle:
 - a. Supply air fan shall run continuously.
 - b. The rooftop unit outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall modulate correspondingly.
 - c. On a fall in space temperature, the unit heating coil valve shall modulate open.
 - d. Upon a rise in space temperature the heating control valve shall close.
 - e. Upon a still further rise in space temperature, the unit shall enable .
 - f. A mixed air low limit controller shall assume control of dampers and valves as required to maintain desired minimum mixed air temperature.
 - 2. Unoccupied cycle:
 - a. The outdoor air damper shall remain fully-closed, return air damper fully-open, heating coil valve fully-open, and the supply air fan shall run intermittently at demand of room sensor to maintain reduced space temperature.
- C. Cooling Mode:
 - 1. Occupied cycle:
 - a. Supply air fan shall run continuously.
 - b. The outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall close correspondingly.
 - c. On a rise in space temperature, the unit mounted dx coil shall energize.
 - 2. Unoccupied cycle:
 - a. The unit is inoperable.
- D.

3.9 DOAS UNIT (DEDICATED OUTDOOR AIR SYSTEM)

- A. General:
 - 1. Unit automatically indexed to "occupied" or "unoccupied" cycle by the DDC.
 - 2. Unit automatically switches from heating to cooling modes.
- B. Heating Mode:
 - 1. Occupied mode
 - a. Supply and return fan shall run continuously. The DDC shall modulate the supply and return fans to maintain constant downstream static pressure.
 - b. The rooftop unit outdoor air damper shall fully open, the return air damper shall fully close and the exhaust air damper shall fully open.
 - c. The heat recovery wheel shall start.

- d. The unit shall modulate the heating coil valve to produce a constant discharge air temperature of 65 degrees (adjustable).
- 2. Unoccupied mode
 - a. The outdoor air damper shall remain fully-closed, return air damper fully-open, exhaust air damper fully closed, the heating valve fully open and the supply fan shall run intermittently at the demand of the room sensors to maintain reduced space temperature.
- C. Cooling Mode
 - 1. Occupied mode
 - a. Supply and return fan shall run continuously.
 - b. The rooftop unit outdoor air damper shall fully open, the return air damper shall fully close and the exhaust air damper shall fully open.
 - c. The heat recovery wheel shall start.
 - d. The unit shall modulate the cooling coil valve to produce a constant discharge air temperature of 55 degrees (adjustable).
 - 2. Unoccupied mode
 - a. The unit is inoperable
- D. Fire shut down shall be provided by the EC via the fire alarm system and by the DDC. When unit is shut down, the outside air dampers shall close and the mixing dampers shall position to 100% return air.

3.10 EXHAUST FAN CONTROL

- A. Exhaust fans shall be started and stopped by the DDC system.
 - 1. If the fan to run by the DDC system and run indication is not met after 2 minutes or fan run indication fails after being proven, an alarm shall be generated at the operator workstation. The call to run shall be turned off.
 - 2. All fans over 1000 CFM and serving more than one space shall be provided with fire shut downs provided by the EC via the fire alarm system. All fans under DDC control shall also shut-down. When the exhaust fan is shut down from fire alarm, the automatic air dampers shall close.

3.11 KITCHEN MAKE-UP AIR UNIT

- A. The kitchen make-up air unit shall run anytime that the associated kitchen hood exhaust fan is running. The associated heat section shall modulate discharge air temperature to maintain a discharge air temperature within 10 degrees of the space temperature.
- B. Fire shutdown shall be by the E.C. and also interlocked with the kitchen hood fire suppression system.

END OF SECTION

SECTION 23 21 13
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. Condenser water piping, above grade.
- E. Equipment drains and overflows.
- F. Pipe hangers and supports.
- G. Unions, flanges, mechanical couplings, and dielectric connections.
- H. Valves:
 - 1. Ball valves.
 - 2. Butterfly valves.
 - 3. Check valves.

1.2 RELATED REQUIREMENTS

- A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.
- B. Section 23 05 53 - Identification for HVAC Piping and Equipment.
- C. Section 23 07 19 - HVAC Piping Insulation.

1.3 REFERENCE STANDARDS

- A. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.
- B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- E. ASME B31.9 - Building Services Piping; 2017.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2019.
- H. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.

- K. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).
- L. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.
- M. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2017.
- N. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2015.
- O. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- P. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992,with Editorial Revision (2018).
- Q. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2013).
- R. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- T. AWWA C606 - Grooved and Shouldered Joints; 2015.
- U. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.

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 01 30 00 - Administrative Requirements for submittal procedures.
- B. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.
- C. Product Data:
 - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
 - 2. Provide manufacturers catalog information.
 - 3. Indicate valve data and ratings.
 - 4. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.
- D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- E. Project Record Documents: Record actual locations of valves.
- F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Valve Repacking Kits: One for each type and size of valve.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum five years of experience.

1.7 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.

1.8 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

1.11 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for valves excluding packing.

1.12 EXTRA MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish two packing kits for each size and valve type.

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 flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:
 1. Provide drain valves where indicated, and if not indicated, provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
 2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
 3. For throttling, bypass, or manual flow control services, use globe, ball, or butterfly valves.
 4. In heating water, chilled water, or condenser water systems, butterfly valves may be used interchangeably with gate and globe valves.
 5. For shut-off and to isolate parts of systems or vertical risers, use gate, ball, or butterfly valves.
- E. Welding Materials and Procedures: Comply with ASME BPVC-IX.

2.2 HEATING WATER AND GLYCOL PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
 1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
 2. Threaded Joints: ASME B16.3, malleable iron fittings.
- B. Steel Pipe Sizes 12 Inches and Greater: ASTM A53/A53M, 3/8 inch wall, black, using one of the following joint types:
 1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
 2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
- C. 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 CONDENSER WATER PIPING, ABOVE GRADE

- A. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
 1. Fittings: ASTM D2466 or ASTM D2467, PVC.
 2. Joints: Solvent welded in accordance with ASTM D2855.
- B. PVC Pipe Sizes 8 Inches and Greater: ASTM D1785, Schedule 80, or ASTM D2241, SDR 21 or 26.
 1. Fittings: ASTM D2466 or ASTM D2467, PVC.
 2. Joints: Solvent welded in accordance with ASTM D2855.

2.4 EQUIPMENT DRAINS AND OVERFLOWS

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:

- B. 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; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
- C. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
 - 1. Fittings: ASTM D2466 or D2467, PVC.
 - 2. Joints: Solvent welded in accordance with ASTM D2855.

2.5 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.
- B. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge-shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

2.6 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

- A. Unions for Pipe of 2 Inches and Less:
 - 1. Ferrous Piping: 150 psi brass or malleable iron, threaded.
 - 2. Copper Pipe: Bronze, soldered joints.
- B. Flanges for Pipe 2 Inches and Greater:
 - 1. Ferrous Piping: 150 psig forged steel, slip-on.
 - 2. Copper Piping: Bronze.
 - 3. Gaskets: 1/16 inch thick, preformed neoprene.
- C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
 - 1. Dimensions and Testing: In accordance with AWWA C606.
 - 2. Mechanical Couplings: Comply with ASTM F1476.
 - 3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
 - 4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

2.7 BALL VALVES

- A. Up To and Including 2 Inches:
 - 1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

2.8 BUTTERFLY VALVES

- A. Body: Cast or ductile iron with resilient replaceable EPDM seat, wafer or lug ends, extended neck.
- B. Disc: Construct of aluminum bronze, chrome plated ductile iron, stainless steel, ductile iron with EPDM encapsulation, or Buna-N encapsulation.
- C. Operator: 10 position lever handle.

2.9 SWING CHECK VALVES

- A. Up To and Including 2 Inches:

1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder or threaded ends.
- B. Over 2 Inches:
 1. Iron body, bronze trim, bronze or bronze faced rotating swing disc, renewable disc and seat, flanged ends.

2.10 SPRING LOADED CHECK VALVES

- A. 2 inches and Smaller: MSS SP 80, Class 250, bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, solder or threaded ends.
- B. 2-1/2 inches and Larger: MSS SP 71, Class 125, wafer style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare piping connections to equipment using jointing system specified.
- E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- C. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- D. Install piping to conserve building space and to avoid interference with use of space.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipe passing through partitions, walls, and floors.
- G. Slope piping and arrange to drain at low points.
- H. 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.

9. Prime coat exposed steel hangers and supports. See Section 09 91 23. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 23 07 19.
- J. Use eccentric reducers to maintain top of pipe level.
- K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.
- L. Install valves with stems upright or horizontal, not inverted.

3.3 TESTING

- A. All piping shall be tested in accordance with the applicable Mechanical Code.
- B. Hydronic piping shall be tested hydrostatically at one and one half times the maximum system design pressure, but not less than 100 psi. Test duration shall be no less than 15 minutes.

3.4 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.
 3. 1-1/2 Inches and 2 Inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 4. 2-1/2 Inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
 5. 3 Inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.

END OF SECTION

SECTION 23 21 14
HYDRONIC SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air vents.
- B. Strainers.
- C. Automatic flow control valves.
- D. Flow meters.
- E. Relief valves.
- F. Glycol system.

1.2 RELATED REQUIREMENTS

- A. Section 23 21 13 - Hydronic Piping.

1.3 REFERENCE STANDARDS

- A. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2017.
- B. ASME B16.11 - Forged Fittings, Socket-welding and Threaded; 2016 (Errata 2017).

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- D. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.5 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum week prior to commencing work of this section.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install instruments when areas are under construction, except rough in, taps, supports and test plugs.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements before fabrication.

1.8 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for piping specialties.

1.9 MAINTENANCE SERVICE

- A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance service.
- B. Furnish service and maintenance of glycol fluid and glycol charging components for two years from Date of Substantial Completion.
- C. Furnish monthly visit for one year starting from Date of Substantial Completion to make glycol fluid concentration analysis on site with refractive index measurement instrument. Detail findings with maintenance personnel in writing of corrective actions needed including analysis and amounts of glycol or water added.

1.10 EXTRA MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish two bottles of red gage oil for static pressure gages.
- C. Furnish two pressure gages with pulsation damper and two thermometers .
- D. Furnish two extra 55 gallon drums of propylene glycol.

1.11 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.12 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. Float Air Vent:

1. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
- C. Maximum Fluid Pressure: 150 psi.
- D. 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.
- B. Size 2-1/2 inch to 4 inch:
 1. Provide flanged or grooved iron body for 175 psi working pressure, Y pattern with 1/16 inch, or 3/64 inch stainless steel perforated screen.
- C. Size 5 inch and Larger:
 1. Provide flanged or grooved iron body for 175 psi working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

2.3 AUTOMATIC FLOW CONTROL VALVES

- A. Manufacturers:
 1. Bell & Gossett, a brand of Xylem, Inc; Circuit Sentry Flo-Setter II: www.bellgossett.com/#sle.
 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Construction:
 1. Valve shall be capable of Class IV shut off without the use of an additional shut-off valve.
 2. Valve Body:
 - a. 1/2 inch through 1-1/4 inch: DZR brass.
 - b. 1-1/2 inch through 2 inch: Ductile iron.
 3. Valve Diaphragm: HNBR.
 4. Two integral pressure/temperature ports.
 5. Dial indicating setting in gallons per minute.
 6. Stainless steel stem with field adjustable locking handle.
- C. Valve Ratings:
 1. Working Pressure: 375 PSIG.
 2. Temperature Range: 14 to 250 degrees F.
 3. Differential Pressure Control Range: 60 psi.
- D. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, minimum pressure 2 psi.
- E. Control Mechanism: Provide stainless steel or nickel-plated, brass piston or regulator cup, operating against stainless steel helical or wave formed spring or elastomeric diaphragm and polyphenylsulfone orifice plate.

2.4 FLOW METERS

- A. Basis of Design: Onicon F-1100 Measuring Station and D-1201 Display Module
- B. Measuring Station: F-100 Meter
 1. Type 316 stainless steel single turbine insertion flow meter
 2. Pressure Rating: 400 psi max.
 3. Maximum Temperature: 180 degrees F. continuous; 200 degrees F peak.
 4. Accuracy:
 - a. Plus or minus 0.5% of reading at calibrated velocity.

- b. Plus or minus 1% of reading from 3 to 30 ft/s (10:1 range)
- c. Plus or minus 2% of reading from .4 to 20ft/s (50:1 range)
- 5. Sensing method: Electronic impedance sensing. (non-magnetic and non-photoelectric)
- 6. Ambient temperature range: -5 to 160 degrees F.

C. Display Module: D-1201

- 1. Construction: 6"x6"x4" NEMA 4 steel enclosure; wall mount.
- 2. Indicators:
 - a. Multi-function LCD with two buttons mode selection, total reset, and programming.
 - b. Six digit rate; eight digit totalization.
- 3. Programming: Factory set for particular flow meter and pipe size.
- 4. Memory: Nonvolatile EEPROM memory retains all programming parameters in the event of power loss
- 5. Flow signal:
 - a. Input: 0-15V pulse output from flow meter
 - b. Output: Provide display module terminal strip for connection to DDC system.

2.5 RELIEF VALVES

- A. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

2.6 GLYCOL SYSTEM

A. Pump System:

- 1. Storage: 15 gal polypropylene tank with bolt-removable hinged solid cover and enamel coated carbon steel tank-stand.
- 2. Pump:
 - a. Thermally protected 1/4 hp motor at 115 to 120 VAC, single phase rated for indoor service.
 - b. Maximum Service Operation: 100 psi at 85 degrees F.
- 3. Mechanical Accessories: System isolation valves, strainer, and pressure gauges.
- 4. Control Panel:
 - a. Fused single-point system connection rated at 115 to 120 VAC, single phase.
 - b. Interface: Hand switches with indicating lights for ON, FAULT, and LOW LEVEL.
 - c. Pressure Switch: Panel-mounted and prewired for 10 psi cut-in and 40 psi cut-out, adjustable.
 - d. Low Level Cut-Off Switch: Prewired to shut-down unit upon activation. Tank-side mounted.
- 5. Pressure Relief Valve: System-mounted brass valve tubed from pump discharge side into tank with adjustable setpoint between 20 psi and 150 psi.

B. Glycol Solution:

- 1. Water-based solution mix containing 30 percent ethylene glycol by volume required for cooling or heating system operating temperature range.
- 2. Cooling or heating System Operating Temperature Range: Between freezing and boiling points of 3 and 220 degees F at 14.7 psia.

- C. Mixing Tank: 55 gallon steel drum with fittings suitable for filling and hand pump for charging, rubber hose for connection of hand pump to system.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.

3.2 INSTALLATION - HYDRONIC PIPING SPECIALTIES

- A. Refer to drawing for required specialties.
- B. Locate test plugs adjacent to thermometers and thermometer sockets and adjacent to pressure gages and pressure gage
- C. Where large air quantities accumulate, provide enlarged air collection standpipes.
- D. Install manual air vents at system high points.
- E. For automatic air vents in ceiling spaces or other concealed locations, install vent tubing to nearest drain.
- F. Provide air separator on suction side of system circulation pump
- G. Connect to expansion tank to system by pipe connected of the bottom of the pump suction line.
- H. Provide drain and hose connection with valve on strainer blow down connection.
- I. Provide pump suction fitting on suction side of base mounted centrifugal pumps. Remove temporary strainers after cleaning systems.
- J. Support pump fittings with floor mounted pipe and flange supports.
- K. Provide relief valves on pressure tanks, low-pressure side of reducing valves, heat exchangers, and expansion tanks.
- L. Select system relief valve capacity greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- M. Pipe relief valve outlet to nearest floor drain.
- N. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.
- O. Feed glycol solution to system through make-up line with pressure regulator, venting system high points. Set to fill at 15 psig.

3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Test for strength of glycol and water solution and submit written test results.

3.4 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Clean and flush glycol system before adding glycol solution.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting installed construction.
- B. Do not install hydronic pressure gauges until after systems are pressure tested.

END OF SECTION

SECTION 23 23 00
REFRIGERANT PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping.
- B. Refrigerant.
- C. Moisture and liquid indicators.
- D. Valves.
- E. Strainers.
- F. Check valves.
- G. Pressure relief valves.
- H. Filter-driers.
- I. Solenoid valves.
- J. Expansion valves.
- K. Receivers.
- L. Flexible connections.

1.2 RELATED REQUIREMENTS

- A. Section 08 31 00 - Access Doors and Panels.
- B. Section 23 07 19 - HVAC Piping Insulation.
- C. Section 23 74 13 - Packaged Outdoor Central-Station Air-Handling Units.

1.3 REFERENCE STANDARDS

- A. AHRI 495 - Performance Rating of Refrigerant Liquid Receivers; 2005.
- B. AHRI 730 (I-P) - Flow Capacity Rating of Suction-Line Filters and Suction-Line Filter-Driers; 2013.
- C. AHRI 750 - Thermostatic Refrigerant Expansion Valves; 2007.
- D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems and Designation and Classification of Refrigerants ; 2019.
- E. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2019.
- F. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2019.
- G. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- H. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
- I. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2016.

- J. ASME B31.9 - Building Services Piping; 2017.
- K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.
- L. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.
- M. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2019.
- N. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).
- O. UL 429 - Electrically Operated Valves; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide general assembly of specialties, including manufacturer's catalogue information. Provide manufacturer's catalog data including load capacity.
- C. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.
- D. Design Data: Submit design data indicating pipe sizing. Indicate load-carrying capacity of trapeze, multiple pipe, and riser support hangers.
- E. Test Reports: Indicate results of leak test, acid test.
- F. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.
- G. Project Record Documents: Record exact locations of equipment and refrigeration accessories on record drawings.
- H. Maintenance Data: Include instructions for changing cartridges, assembly views, spare parts lists.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store piping and specialties in shipping containers with labeling in place.
- B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.
- C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for valves excluding packing.

1.11 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish two refrigerant oil test kits each containing everything required for conducting one test.

1.12 EXTRA MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish two refrigerant filter-dryer cartridges of each type.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Filter-Driers:
 - 1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

2.2 REGULATORY REQUIREMENTS

- A. Comply with ASME B31.9 for installation of piping system.

2.3 PIPING

- A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
 - 1. Fittings: ASME B16.22 wrought copper.
 - 2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Copper Tube to 7/8-inch OD: ASTM B88 (ASTM B88M), Type K (A), annealed.
 - 1. Fittings: ASME B16.26 cast copper.
 - 2. Joints: Flared.
- C. Pipe Supports and Anchors:
 - 1. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.
 - 2. Vertical Support: Steel riser clamp.
 - 3. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
 - 4. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.4 MOISTURE AND LIQUID INDICATORS

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or soldered ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.5 VALVES

- A. Diaphragm Packless Valves:
 - 1. UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, soldered or flared ends, with positive backseating; for maximum working pressure of 500 psi and maximum temperature of 275 degrees F.
- B. Service Valves:
 - 1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or soldered ends, for maximum pressure of 500 psi.

2.6 STRAINERS

- A. Straight Line or Angle Line Type:
 - 1. Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass; for maximum working pressure of 430 psi.

2.7 CHECK VALVES

- A. Globe Type:
 - 1. Cast bronze or forged brass body, forged brass cap with neoprene seal, brass guide and disc holder, phosphor-bronze or stainless steel spring, teflon seat disc; for maximum temperature of 300 degrees F and maximum working pressure of 500 psi.
- B. Straight Through Type:
 - 1. Brass body and disc, phosphor-bronze or stainless steel spring, neoprene seat; for maximum working pressure of 500 psi and maximum temperature of 250 degrees F.

2.8 PRESSURE RELIEF VALVES

- A. Straight Through or Angle Type: Brass body and disc, neoprene seat, factory sealed and stamped with ASME UV and National Board Certification NB, selected to ASHRAE Std 15, with standard setting of 450 psi.

2.9 FILTER-DRIERS

- A. Performance:
 - 1. Design Working Pressure: 500 psi, minimum.
- B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.
- C. Construction: UL listed.
 - 1. Connections: As specified for applicable pipe type.

2.10 SOLENOID VALVES

- A. Valve: AHRI 760 I-P, pilot operated, copper, brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil

failure), integral strainer, with flared, soldered, or threaded ends; for maximum working pressure of 500 psi.

2.11 EXPANSION VALVES

- A. Angle or Straight Through Type: AHRI 750; design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with nonreplaceable capillary tube and remote sensing bulb and remote bulb well.
- B. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F superheat. Select to avoid being undersized at full load and excessively oversized at part load.

2.12 RECEIVERS

- A. Internal Diameter 6 inch and Smaller:
 - 1. AHRI 495, UL listed, steel, brazed; 400 psi maximum pressure rating, with tappings for inlet, outlet, and pressure relief valve.
- B. Internal Diameter Over 6 inch:
 - 1. AHRI 495, welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; 400 psi with tappings for liquid inlet and outlet valves, pressure relief valve, and magnetic liquid level indicator.

2.13 FLEXIBLE CONNECTORS

- A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

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 with flanges or unions.

3.2 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- E. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.5.
 - 2. Support horizontal piping as indicated.
 - 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.

- F. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 08 31 00.
- I. Fully charge completed system with refrigerant after testing.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Test refrigeration system in accordance with ASME B31.5.
- C. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test and repair piping until no leakage.

3.4 SCHEDULES

- A. Hanger Spacing for Copper Tubing.
 - 1. 1/2 inch, 5/8 inch, and 7/8 inch OD: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 - 2. 1-1/8 inch OD: Maximum span, 6 feet; minimum rod size, 1/4 inch.
 - 3. 1-3/8 inch OD: Maximum span, 7 feet; minimum rod size, 3/8 inch.
 - 4. 1-5/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - 5. 2-1/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ducts.
- B. Flexible ducts.
- C. Air plenums and casings.
- D. Ducts for kitchen exhaust applications.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 23 05 48 - Vibration and Seismic Controls for HVAC.
- C. Section 23 07 13 - Duct Insulation: External insulation and duct liner.
- D. Section 23 33 00 - Air Duct Accessories.

1.3 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASHRAE Std 126 - Method of Testing HVAC Air Ducts; 2016.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- G. ASTM D7803 - Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating; 2012 (Reapproved 2019).
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- I. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- J. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- K. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- L. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.
- M. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.

- N. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- O. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2018.
- P. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.
- Q. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- R. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.
- S. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.
- T. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.
- U. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- V. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.
- W. UL 2221 - Tests of Fire Resistive Grease Duct Enclosure Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for duct materials.
- C. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for all modifications / systems. Contractor will be responsible for any rework of shop drawings due to field conditions prior to approval of drawings. Contractor shall field verify field conditions prior to submitting shop drawings.
- D. Samples: Submit RAL color charts for powder coat selection and verification prior to fabrication.
- E. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate per appropriate seal class, following SMACNA (LEAK).
- F. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 CLOSEOUT SUBMITTALS

- A. See Section 01 70 00 - Execution and Closeout Requirements for closeout procedures.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.
- C. Maintain one copy of each document on site.

1.7 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.
- C. Provide offsets as required for installation of ductwork due to field conditions.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements of all duct installations prior to fabrication.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Provide metal duct unless otherwise indicated.
- C. Duct Shape and Material in accordance with Allowed Static Pressure Range:
- D. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Supply Air: 4 in-wc pressure class, galvanized steel.
 - b. Outside Air Intake: 4 in-wc pressure class, galvanized steel.
 - c. Return and Relief Air: 4 in-wc pressure class, galvanized steel.
 - d. General Exhaust Air: 1/2 in-wc pressure class, galvanized steel.
 - e. Transfer-air and Sound Booths: 1/2 in-wc pressure class, fibrous glass.
 - 2. Low Pressure Service: Up to 2 in-wc:
 - a. Seal: Class C, apply to seal off transverse joints.
- E. Duct Fabrication Requirements:
 - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 2. 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.
 - 3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
 - 4. Construct tees, 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 airfoil turning vanes of perforated metal with glass fiber insulation.
 - 5. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
 - 6. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
 - 7. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.

8. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 FIELD PAINTED FINISHES:

- A. Where exposed metal ducts within finished spaces are indicated to be finished, all exposed portions shall be manufactured and treated as indicated:
 1. Shop Powder Coated Finishes:
 - a. Base metal shall be galvanized steel to promote adhesion, with flanged construction for field assembly, length of 10 feet maximum.
 - b. Surfaces shall be prepared in accordance with ASTM D7803, including but not limited to pre-treatment cleaning, application of corrosion inhibitors, and pre-bake.
 - c. Powder coating to be applied at 3 - 6 mils thick prior to baking for proper cure.
 - d. Color: As selected by Architect/Engineer from full RAL spectrum.

2.3 METAL DUCTS

- A. Material Requirements:
 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
 2. Aluminum: ASTM B209/B209M, aluminum sheet, alloy 3003-H14.
 3. Stainless Steel: ASTM A666, Type 304.
- B. Rectangular Metal Duct:
 1. Rectangular Double Wall Insulated: Rectangular spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
 - a. Insulation:
 - 1) Thickness: 1 inch.
 - 2) Material: Fiberglass.
- C. Flat-Oval Metal Ducts:
 1. Flat-Oval Double Wall Insulated Duct: Machine made from round spiral lock seam duct.
 - a. Fittings: Manufacture with solid inner wall.
 - b. Inner Wall: Perforated galvanized steel.
 - c. Insulation:
 - 1) Thickness: 1 inch fiberglass.
- D. Round Metal Ducts:
 1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
 2. Round Double Wall Insulated Duct: Round spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
 - a. Insulation:
 - 1) Thickness: 1 inch.
 - 2) Material: Fiberglass.
 3. Round Connection System: Interlocking duct connection system per SMACNA (DCS).
- E. Round Spiral Duct:
 1. Round spiral lock seam duct with galvanized steel outer wall.
- F. Connectors, Fittings, Sealants, and Miscellaneous:
 1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
 2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
 3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.

- a. 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.
 - b. VOC Content: Not more than 250 g/L, excluding water.
 - c. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 - d. For Use with Flexible Ducts: UL labeled.
4. Gasket Tape:
- a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
5. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
6. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows:
- a. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 - b. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - c. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 - d. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
 - e. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
- G. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form a spiral helix.
1. Insulation: R6 insulation with polyethylene vapor barrier film.
 2. Pressure Rating: 10 in-wc positive and 5 in-wc negative.
 3. Maximum Velocity: 5500 fpm.
 4. Temperature Range: Minus 20 degrees F to 250 degrees F.

2.4 FLEXIBLE DUCTS

- A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
1. Insulation: R6 insulation with polyethylene vapor barrier film.
 2. Pressure Rating: 10 in-wc positive and 5 in-wc negative.
 3. Maximum Velocity: 4000 fpm.
 4. Temperature Range: Minus 20 degrees F to 250 degrees F.

2.5 AIR PLENUMS AND CASINGS

- A. Fabricate in accordance with SMACNA (DCS) for indicated operating pressures indicated.
- B. Minimum Fabrication Requirements:
1. Fabricate acoustic plenum or casing with reinforcing turned inward.
 2. Provide 16-gauge, 0.059-inch sheet steel back facing and 22-gauge, 0.029-inch perforated sheet steel front facing with 3/32 inch diameter holes on 5/32 inch centers.
 3. Construct panels 3 inches thick, packed with 4.5 pcf minimum glass fiber insulation media, on inverted channel of 16-gauge, 0.059-inch sheet steel.
 4. Mount floor-mounted plenum or 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, 0.052-inch expanded metal mesh supported at 12-inch centers, turned up 12 inches at sides with sheet metal shields.
- C. Access Doors:
1. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.
 2. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles.
 3. Provide clear wire glass observation ports, minimum 6 by 6 inch size.

2.6 DUCTS FOR KITCHEN EXHAUST APPLICATIONS

- A. Provide ductwork, fittings, and appurtenances in accordance with NFPA 96, SMACNA (KVS), UL 1978, and UL 2221 requirements and guidelines.
- B. Class 1 duct for air with gas and grease particle exhaust at an air velocity of 1,500 to 2,500 fpm.
- C. Where ducts are not self-draining back to equipment, provide low-point drain pocket with the copper drain pipe to a sanitary sewer.
- D. Design, fabricate, and install liquidtight preventing exhaust leakage into building.
- E. Dishwasher Exhaust Duct:
 - 1. Duct Size: 4 in-wc pressure class stainless steel.
 - 2. Fabricate using single wall, 20-gauge, 0.035-inch Type 304 stainless steel with external welded joints.
 - 3. Seal joints during installation with factory-supplied overlapping V-bands and sealant.
- F. Kitchen Hood and Grease Exhaust Duct:
 - 1. Fabricate in accordance with ductwork manufacturer's instructions, SMACNA (DCS), SMACNA (KVS), and NFPA 96.
 - 2. Round, Double-Wall, Premanufactured Grease Exhaust Ducts:
 - a. UL Listed and labeled to UL 1978.
 - b. Nominal 1 inch thick, body soluble fiber insulation that fills annular space between inner liner of 20-gauge, 0.035 inch Type 304 stainless steel and outer jacket of 24-gauge, 0.023-inch aluminized steel.
 - 3. Zero Clearance, 2-Hour Fire-Rated, Round, Double-Wall, Premanufactured Grease Duct:
 - a. UL Listed and labeled to UL 1978 and UL 2221.
 - b. Nominal 3 inches thick, high density body soluble fiber insulation between 20-gauge, 0.035-inch Type 304 stainless steel liner, and 24-gauge, 0.0239-inch aluminized steel sheet outer jacket.
 - c. Seal joints during installation with factory-supplied overlapping V-bands and sealant.
 - d. Through-penetration firestop listed to UL 1479 or ASTM E814.
 - e. Minimum horizontal slope of 1/16 inch per foot per manufacturers listing to UL 1978.

2.7 EXTERIOR METAL DUCTS

- A. Double wall foam insulated metal duct designed for outdoor use, constructed and tested to comply with UL 723 and ASTM E84.
 - 1. Flanged section construction and fully water tight when joined in accordance with manufacturer recommendations.
 - 2. Insulation: Foamed in place, two part, low density rigid urethane foam, free of voids:
 - a. Thickness: two inch; minimum R-value of 12.9
 - 3. Finish: factory powder coat, color to be selected by architect from full RAL range.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products following the manufacturer's instructions.
- B. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.

- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- E. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.
- F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- G. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with a crimp in the direction of airflow.
- H. Use double nuts and lock washers on threaded rod supports.
- I. Connect terminal units to supply ducts directly or with one foot maximum length of flexible duct. Do not use flexible duct to change direction.
- J. 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.
- K. Set plenum doors at 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
- L. At exterior wall louvers, seal duct to louver frame and transition to louver frame size.
- M. Duct Insulation: Provide duct insulation. See Section 23 07 13.

3.2 CLEANING

- A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.
- B. Clean duct systems with high-power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters or bypass during cleaning. Provide adequate access to the ductwork for cleaning purposes.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Combination fire and smoke dampers.
- D. Duct test holes.
- E. Fire dampers.
- F. Smoke dampers.

1.2 RELATED REQUIREMENTS

- A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.
- B. Section 23 31 00 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

- A. ICC (IMC)-2015 - International Mechanical Code; 2015.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- C. NFPA 92 - Standard for Smoke Control Systems; 2018.
- D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- E. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
- F. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
- G. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors, and duct test holes.
- D. Manufacturer's Installation Instructions: Provide instructions for fire dampers and combination fire and smoke dampers.
- E. Project Record Drawings: Record actual locations of access doors and test holes.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.

2. Extra Fusible Links: One of each type and size.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit for Fire Dampers.

1.6 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. Dampers tested, rated and labeled in accordance with the latest UL requirements.
- C. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.
- D. Maintain one copy of each document on site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.
- B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
- C. Storage: Store materials in a dry area indoor, protected from damage.
- D. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work where appropriate with building control Work.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 BACKDRAFT DAMPERS - METAL

- A. Manufacturers:
 1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
 2. Nailor Industries, Inc: www.nailor.com/#sle.
- B. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

- C. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 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.

2.4 FIRE DAMPERS

- A. Manufacturers:
 - 1. Nailor Industries, Inc: www.nailor.com/#sle.
 - 2. PCI Industries, Inc; Pottorff Brand : www.pottorff.com.
 - 3. Ruskin Company, a brand of Johnson Controls: www.ruskin.com/#sle.
- B. 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 except for 1-inch pressure-class ducts up to 12 inches in height.
- C. Fusible Links: UL 33, separate at 160 degrees F with adjustable link straps for combination fire/balancing dampers.

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). See Section 23 31 00 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- 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. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.
- F. Demonstrate re-setting of fire dampers to Owner's representative.

END OF SECTION

SECTION 23 34 23
HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof exhausters.
- B. Kitchen hood upblast roof exhausters.

1.2 RELATED REQUIREMENTS

- A. Section 23 05 48 - Vibration and Seismic Controls for HVAC.
- B. Section 23 31 00 - HVAC Ducts and Casings.
- C. Section 23 33 00 - Air Duct Accessories: Backdraft dampers.

1.3 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005 (Reaffirmed 2012).
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
- G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.
- H. UL 762 - Outline of Investigation for Power Roof Ventilators for Restaurant Exhaust Appliances; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate fan roof curbs and service utilities installation according to fan size.
- B. Sequencing: Ensure that utility connections are completed in an orderly and expeditious manner.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Loren Cook Company: www.lorencook.com/#sle.
- B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: Comply with AMCA 204.
- B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
- D. Fabrication: Comply with AMCA 99.
- E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- F. Kitchen Hood Exhaust Fans: Comply with requirements of NFPA 96 and UL 762.

2.3 ROOF EXHAUSTERS

- A. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
- B. Roof Curb: 18 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips.
- C. Disconnect Switch: Factory wired, nonfusible, in housing for thermal overload protected motor and wall mounted multiple speed switch.
- D. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
- E. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm gets attained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.4 KITCHEN HOOD UPBLAST ROOF EXHAUSTERS

- A. Direct Drive Fan:
 1. Fan Wheel:
 - a. Type: Non-overloading, backward inclined centrifugal.
 - b. Material: Aluminum, statically and dynamically balanced.
 2. Housing:
 - a. Construct of heavy gauge aluminum including curb cap, windband, and motor compartment.
 - b. Rigid internal support structure.
 - c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.

- d. Construct drive frame assembly of heavy gauge steel, mounted on vibration isolators.
 - e. Provide breather tube for fresh air motor cooling and wiring.
- B. Shafts and Bearings:
- 1. Fan Shaft:
 - a. Ground and polished steel with anti-corrosive coating.
 - b. First critical speed at least 25 percent over maximum cataloged operating speed.
 - 2. Bearings:
 - a. Permanently sealed or pillow block type.
 - b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
 - c. 100 percent factory tested.
- C. Drain Trough: Allows for single-point drainage of water, grease, and other residues.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
- D. Provide sheaves required for final air balance.
- E. Install backdraft dampers on inlet to roof and wall exhausters.

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rectangular ceiling diffusers.
- B. Registers/grilles:
 - 1. Ceiling-mounted, exhaust and return register/grilles.
- C. Duct-mounted supply and return registers/louvers.
- D. Louvers

1.2 RELATED REQUIREMENTS

- A. Section 09 91 23 - Interior Painting: Painting of ducts visible behind outlets and inlets.

1.3 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
- B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).

1.4 SUBMITTALS

- A. See Section 01 30 00 - 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.
- C. Project Record Documents: Record actual locations of air outlets and inlets.
- D. Test Reports: Rating of air outlet and inlet performance.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Price Industries: www.price-hvac.com/#sle.
- B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 RECTANGULAR CEILING DIFFUSERS

- A. Type: Provide square, stamped, multi-core, square, adjustable pattern, stamped, multi-core, square and rectangular, multi-louvered, square and rectangular, adjustable pattern, and multi-louvered diffuser to discharge air in 360 degree, one way, two way, three way, and four way pattern with sectorizing baffles where indicated.
- B. Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.
- C. Fabrication: Steel with baked enamel finish.
- D. Accessories: Provide radial opposed blade, butterfly, and combination splitter volume control damper; removable core, sectorizing baffle, safety chain, wire guard, equalizing grid, operating rod extension, anti-smudging device, and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

2.3 DUCT-MOUNTED SUPPLY AND RETURN REGISTERS/LOUVERS

- A. Type: Duct-mounted, rectangular register for round-spiral duct with adjustable pivot-ended blades, end caps, built-in volume damper, and dual cover flanges to lay flush on duct surface regardless of diameter. Performance to match manufacturer's catalog data.

2.4 CEILING SUPPLY REGISTERS/GRILLES

- A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, double deflection.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory off-white enamel finish.
- D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.
- E. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.

2.5 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 inch margin with Channel lay-in frame for suspended grid ceilings.
- C. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.
- E. Gymnasiums: Provide front pivoted or welded in place blades, securely fastened to be immobile.

2.6 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. Mounting: Furnish with interior 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. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black, see Section 09 91 23.

END OF SECTION

SECTION 23 74 13
PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaged DOAS & RTU roof top unit.
- B. Packaged MAU roof top unit.
- C. Unit controls.
- D. Remote panel.
- E. Roof mounting curb and base.
- F. Maintenance service.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Materials and installation of field fabricated roof mounting curbs.
- B. Section 07 72 00 - Roof Accessories: Placement and installation of factory fabricated roof mounting curbs.
- C. Section 23 05 48 - Vibration and Seismic Controls for HVAC.
- D. Section 26 05 83 - Wiring Connections: Installation and wiring of thermostats and other controls components; wiring from unit terminal strip to remote panel.
- E. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- C. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- D. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.
- E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Filters: One set for each unit.

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. Unit Manufacturer shall have an on-site laboratory certified by AHRI and DOE to test all units and the ability to accommodate customer witness tests. The laboratory shall have the ability to simultaneously measure supply, return, and outside sound at actual load conditions in both 1/3 octaves and full octaves.
- C. 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 units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Aaon: www.aaon.com.
- B. Or approved equal.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 DOAS ROOFTOP UNITS & RTU ROOFTOP UNITS

- A. General Description
 1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, water-cooled condensers, reheat coil, gas heaters, electric heaters, hot water coil, steam coil, exhaust fans, return fans, energy recovery wheels, and unit controls.
 2. Packaged cold climate air-source heat pump rooftop unit shall include variable speed compressors, evaporator coils, electronic expansion valves, reversing valves, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, reheat coil, auxiliary dual fuel gas heaters, electric heaters, hot water coil, steam coil, exhaust fans, return fans, energy recovery wheels, and unit controls.
 3. Outdoor air handling unit shall include filters, supply fans, dampers, chilled water coils, DX evaporator coils, gas heaters, electric heaters, hot water coil, steam coil, exhaust fans, return fans, energy recovery wheels, and unit controls.
 4. Unit shall be factory assembled and tested including leak testing of the coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the controls compartment's literature pocket.
 5. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.

6. Unit components shall be labeled, including pipe stub outs, refrigeration system components and electrical and controls components.
7. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
8. Installation, Operation and Maintenance manual shall be supplied within the unit.
9. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's access door.
10. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's access door.

B. Construction

1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.
3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.
4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
5. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 210/240. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
6. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
7. Access to filters, dampers, cooling coils, reheat coil, energy recovery wheels, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
8. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
9. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
10. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.
11. Unit shall include lifting lugs on the top of the unit.
12. Unit base shall be fabricated of 1 inch thick double wall, impact resistant, rigid polyurethane foam panels.
13. Unit shall include factory wired control panel compartment LED service lights.

C. Electrical

1. Unit shall be provided with standard power block for connecting power to the unit.
2. Unit shall have a 10 kAIC SCCR.

3. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.
 4. Air-source heat pump shall include an optimized start defrost cycle to prevent frost accumulation on the outdoor coil during heat pump heating operation and to minimized defrost cycle energy usage. If the temperature of the outdoor heat exchanger and/or the suction line is less than a predetermined value, a deferred defrost cycle is initiated wherein the defrost cycle starts after a variable, continuously optimizing, time interval has elapsed. The defrost cycle is terminated when the relative temperatures of the outdoor heat exchanger and/or the suction line indicate that sufficient frost is melted from the heat exchanger to insure adequate time between successive defrost cycles for optimizing the efficiency and reliability of the system, or after a predetermined time interval has elapsed, whichever condition occurs first. During defrost cycle all compressors shall energize, reversing valves shall energize, and auxiliary heat shall energize. [Orion Controls System]
 5. Unit shall be provided with factory installed and factory wired 115V, 12 amp GFI outlet with outlet disconnect switch in the unit control panel.
 6. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more that 10% out of balance on voltage, the voltage is more that 10% under design voltage, or on phase reversal.
- D. Supply Fans
1. Unit shall include direct drive, unhooded, backward curved, plenum supply fans.
 2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
 3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
 4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.
- E. Exhaust Fans
1. Exhaust dampers shall be sized for 100% relief.
 2. Fans and motors shall be dynamically balanced.
 3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
 4. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn lockable handles.
 5. Unit shall include belt driven, unhooded, backward curved, plenum exhaust fans.
 6. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.
- F. Cooling Coils
1. Evaporator Coils
 - a. Coils shall be designed for use with R-454B refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
 - b. Coils shall be 6 row high capacity.
 - c. Coils shall have interlaced circuitry and shall be 6 row high capacity.
 - d. Coils shall be hydrogen or helium leak tested.
 - e. Coils shall be furnished with factory installed expansion valves.
- G. Refrigeration System
1. Unit shall be factory charged with R-454B refrigerant.
 2. Compressors shall be scroll type with thermal overload protection and carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory.
 3. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam injected panels to prevent the transmission of noise outside the cabinet.

4. Compressors shall be isolated from the base pan with the compressor manufacturer's recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.
5. Each refrigeration circuit shall be equipped with expansion valve type refrigerant flow control.
6. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader type service fittings on both the high pressure and low pressure sides and a factory installed replaceable core liquid line filter driers.
7. Unit shall include a variable capacity scroll compressor on the refrigeration circuit which shall be capable of modulation from 10-100% of its capacity.
8. Refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.
9. Lead refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.
10. Unit shall be configured as a cold climate air-source heat pump. Refrigeration circuit shall each be equipped with a factory installed liquid line filter drier with check valve, reversing valve, accumulator, and electronic expansion valves on both the indoor and outdoor coils. Reversing valve shall energize during the heat pump cooling mode of operation.
11. Each capacity stage shall be equipped with a 5 minute off, delay timer to prevent compressor short cycling.
12. Each capacity stage shall be equipped with an adjustable, 20 second delay timer to prevent multiple capacity stages from starting all at once.
13. Unit shall be provided with an adjustable compressor lockout.
14. First capacity stage shall be provided with adjustable on/off condenser fan cycling and an adjustable compressor lockout to allow cooling operation down to 35°F.

H. Condensers

1. Air-Cooled Condenser
 - a. Condenser fans shall be a vertical discharge, axial flow, direct drive fans.
 - b. Coils shall be designed for use with R-454B refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes.
 - c. Heat pump outdoor coil shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and aluminum end casings. Fin design shall be sine wave rippled.
 - d. Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.
 - e. Coils shall be hydrogen or helium leak tested.
 - f. Condenser fans shall be high efficiency electrically commutated motor driven with factory installed head pressure control module. Condenser airflow shall continuously modulate based on head pressure and cooling operation shall be allowed down to 35°F with adjustable compressor lockout.
 - g. Condenser fans shall be VFD driven variable speed for condenser head pressure control. Factory provided and factory programmed VFDs shall continuously modulate the fan air flow to maintain head pressure at acceptable levels. Cooling operation shall be allowed down to 35°F with adjustable compressor lockout.

I. Heating Coils

1. Hot Water Heating Coils
 - a. Coils shall be certified in accordance with AHRI Standard 410 and be hydrogen or helium leak tested.

- b. Coils shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
 - c. Coils shall be two rows, half serpentine circuitry, and 12 fins per inch.
 - d. Coils shall be located in the reheat position downstream of the cooling coil.
 - e. Control valves shall be field supplied and field installed.
 - f. Hot water heating capacity shall be available for operation when heat pump heating is in operation and when heat pump heating is not in operation.
- J. Filters
- 1. Unit shall include 4 inch thick, pleated panel filters with an ASHRAEMERV rating of 13, upstream of the cooling coil. Unit shall also include 2 inch thick, pleated panel pre filters with an ASHRAE MERV rating of 8, upstream of the 4 inch standard filters.
 - 2. Unit shall include 1 inch aluminum mesh pre filters upstream of the outside air opening.
 - 3. Unit shall include a clogged filter switch.
 - 4. Unit shall include a Magnahelics gauge mounted in the controls compartment.
- K. Outside Air/Economizer
- 1. Unit shall include 0-100% economizer consisting of a motor operated outside air damper and return air damper assembly constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven and designed to have no more than 20 cfm of leakage per sq ft. at 4 in. w.g. air pressure differential across the damper. Low leakage dampers shall be Class 2 AMCA certified, in accordance with AMCA Standard 511. Damper assembly shall be controlled by spring return DDC actuator. Unit shall include outside air opening bird screen, outside air hood, and barometric relief dampers.
- L. Energy Recovery
- 1. Unit shall contain a factory mounted and tested energy recovery wheel(s). The energy recovery wheel(s) shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seals and bearings.
 - 2. The energy recovery component shall incorporate a rotary wheel in an insulated cassette frame complete with seals, 3-phase inverter duty drive motor and drive belt.
 - 3. Energy Recovery Wheel(s) shall be 4" thick Aluminum Monolith design with 3 Angstrom desiccant coating for minimal cross contamination. Wheels that allow contaminants larger than 3 Angstrom will not be accepted. Wheels with segments shall not be accepted.
 - 4. All diameter and perimeter seals shall be provided on both sides as part of the cassette assembly and shall be factory set. Drive belts shall be dust free segmented reinforced composite steel.
 - 5. The energy recovery cassette shall be an Underwriters Laboratories Recognized Component for electrical and fire safety. The wheel drive motor shall be an Underwriters Laboratory Recognized Component and shall be mounted in the cassette frame and supplied with a service connector or junction box. Thermal performance shall be certified by the manufacturer in accordance with ASHRAE Standard 84, Method of Testing Air-to-Air Heat Exchangers and AHRI Standard 1060, Rating Air-to-Air Energy Recovery Ventilation Equipment. Cassettes shall be listed in the AHRI Certified Products.
 - 6. Energy recovery wheel cassette shall carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory. The first 12 months from the date of equipment startup, or 18 months from the date of original equipment shipment from the factory, whichever is less, shall be covered under the standard AAON limited parts warranty.
 - 7. Unit shall include 2 inch thick, pleated panel outside air filters with an ASHRAE MERV rating of 8, upstream of the wheels.
 - 8. Hinged service access doors shall allow access to the wheel.
 - 9. Unit shall include a VFD on the energy recovery wheel motor.
 - 10. Unit shall include energy recovery wheel defrost control which includes an adjustable temperature sensor and timer wired to periodically stop the wheel rotation, which allows the warm exhaust air to defrost the wheel.

11. Unit shall include energy recovery wheel rotation detection sensors and a set of normally open and normally closed contacts for field indication of wheel rotation.

M. Controls

1. Factory Installed and Factory Provided Controller with Bacnet interface.
 - a. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested.
 - b. Controller shall be capable of standalone operation with unit configuration, set point adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.
 - c. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
 - d. Controller shall include non-volatile memory to retain all programmed values, without the use of an external battery, in the event of a power failure.
 - e. Constant Volume Controller
 - 1) Unit shall modulate cooling with constant airflow to meet space temperature cooling loads.
 - 2) With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet space humidity loads and prevent supply air temperature swings and overcooling of the space.
 - 3) Unit shall modulate heating with constant airflow to meet space temperature heating loads. With staged heating, capacity shall modulate based on space temperature. With modulating heating, capacity shall modulate based on supply air temperature.
 - f. Makeup Air Controller
 - 1) Unit shall modulate cooling with constant airflow to meet ventilation outside air loads. Cooling capacity shall modulate based on supply air temperature.
 - 2) Hot gas bypass shall be required on the lead refrigeration circuits of systems without variable capacity compressors.
 - 3) With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet outside air humidity loads and prevent supply air temperature swings and overcooling of the space.
 - 4) Unit shall modulate heating with constant airflow to meet ventilation outside air loads. Heating capacity shall modulate based on supply air temperature.

N. Accessories

1. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

2.3 MAU ROOFTOP UNIT

A. General Description:

1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, water-cooled condensers, reheat coil, gas heaters, electric heaters, hot water coil, steam coil, exhaust fans, return fans, energy recovery wheels, and unit controls.
2. Packaged cold climate air-source heat pump rooftop unit shall include variable speed compressors, evaporator coils, electronic expansion valves, reversing valves, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, reheat coil, auxiliary dual fuel gas heaters, electric heaters, hot water coil, steam coil, exhaust fans, return fans, energy recovery wheels, and unit controls.
3. Outdoor air handling unit shall include filters, supply fans, dampers, chilled water coils, DX evaporator coils, gas heaters, electric heaters, hot water coil, steam coil, exhaust fans, return fans, energy recovery wheels, and unit controls.

4. Unit shall be factory assembled and tested including leak testing of the coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the controls compartment's literature pocket.
5. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
6. Unit components shall be labeled, including pipe stub outs, refrigeration system components and electrical and controls components.
7. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
8. Installation, Operation and Maintenance manual shall be supplied within the unit.
9. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's access door.
10. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's access door.

B. Construction

1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.
3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel, and prevents exterior condensation on the panel.
4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
5. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 210/240. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
6. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
7. Access to filters, dampers, cooling coils, reheat coil, energy recovery wheels, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
8. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
9. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
10. Unit shall be provided with base discharge and return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.
11. Unit shall include lifting lugs on the top of the unit.
12. Unit base shall be fabricated of 1 inch thick double wall, impact resistant, rigid polyurethane foam panels.
13. Unit shall include factory wired control panel compartment LED service lights.

- C. Electrical:
1. Unit shall be provided with standard power block for connecting power to the unit.
 2. Unit shall have a 10 kAIC SCCR.
 3. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.
 4. Air-source heat pump shall include an optimized start defrost cycle to prevent frost accumulation on the outdoor coil during heat pump heating operation and to minimized defrost cycle energy usage. If the temperature of the outdoor heat exchanger and/or the suction line is less than a predetermined value, a deferred defrost cycle is initiated wherein the defrost cycle starts after a variable, continuously optimizing, time interval has elapsed. The defrost cycle is terminated when the relative temperatures of the outdoor heat exchanger and/or the suction line indicate that sufficient frost is melted from the heat exchanger to insure adequate time between successive defrost cycles for optimizing the efficiency and reliability of the system, or after a predetermined time interval has elapsed, whichever condition occurs first. During defrost cycle all compressors shall energize, reversing valves shall energize, and auxiliary heat shall energize. [Orion Controls System]
 5. Unit shall be provided with factory installed and factory wired 115V, 12 amp GFI outlet with outlet disconnect switch in the unit control panel.
 6. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more that 10% out of balance on voltage, the voltage is more that 10% under design voltage, or on phase reversal.
- D. Supply Fans
1. Unit shall include direct drive, unhooded, backward curved, plenum supply fans.
 2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
 3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
 4. Variable frequency drives shall be factory wired and mounted in the unit. Fan motors shall be premium efficiency.
- E. Heating Coils
1. Hot Water Heating Coils
 - a. Coils shall be certified in accordance with AHRI Standard 410 and be hydrogen or helium leak tested.
 - b. Coils shall be constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
 - c. Coils shall be two rows, half serpentine circuitry, and 12 fins per inch.
 - d. Coils shall be located in the reheat position downstream of the cooling coil.
 - e. Control valves shall be field supplied and field installed.
 - f. Hot water heating capacity shall be available for operation when heat pump heating is in operation and when heat pump heating is not in operation.
- F. Filters:
1. Unit shall include 4 inch thick, pleated panel filters with an ASHRAEMERV rating of 13, upstream of the cooling coil. Unit shall also include 2 inch thick, pleated panel pre filters with an ASHRAE MERV rating of 8, upstream of the 4 inch standard filters.
 2. Unit shall include 1 inch aluminum mesh pre filters upstream of the outside air opening.
 3. Unit shall include a clogged filter switch.
 4. Unit shall include a Magnahelics gauge mounted in the controls compartment.
 5. Unit shall include 100% outside air opening, without a damper assembly, with bird screen, and outside air hood.
- G. Controls:
1. Factory Installed and Factory Provided Controller with Bacnet interface.
 - a. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested.

ITEM AD1-2 Refer to Section 23 74 13 – Packaged Outdoor Central-Station Air-Handling Units

AMEND subparagraph 2.3, G, 1 to read:

“ 1. Standard Terminal Block

- a. Unit shall be provided with a terminal block for field installation of controls.”

NG UNITS

- b. Controller shall be capable of standalone operation with unit configuration, set point adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.
- c. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
- d. Controller shall include non-volatile memory to retain all programmed values, without the use of an external battery, in the event of a power failure.
- e. Constant Volume Controller
 - 1) Unit shall modulate cooling with constant airflow to meet space temperature cooling loads.
 - 2) With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet space humidity loads and prevent supply air temperature swings and overcooling of the space.
 - 3) Unit shall modulate heating with constant airflow to meet space temperature heating loads. With staged heating, capacity shall modulate based on space temperature. With modulating heating, capacity shall modulate based on supply air temperature.
- f. Makeup Air Controller
 - 1) Unit shall modulate cooling with constant airflow to meet ventilation outside air loads. Cooling capacity shall modulate based on supply air temperature.
 - 2) Hot gas bypass shall be required on the lead refrigeration circuits of systems without variable capacity compressors.
 - 3) With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet outside air humidity loads and prevent supply air temperature swings and overcooling of the space.
 - 4) Unit shall modulate heating with constant airflow to meet ventilation outside air loads. Heating capacity shall modulate based on supply air temperature.

H. Accessories:

- 1. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

2.4 CURBS

- A. Curbs shall to be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit. Curb gasket shall be furnished within the control compartment of the rooftop unit to be mounted on the curb immediately before mounting of the rooftop unit.
- B. Solid bottom curb shall be factory assembled and fully lined with curb rated 1 inch fiberglass insulation and include a wood nailer strip. (Curb shall be adjustable up to 3/4 inch per foot to allow for sloped roof applications.)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that proper power supply is available.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Install in accordance with NFPA 90A.
- C. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.
- D. Locate remote panels where indicated on drawings.

3.3 SYSTEM STARTUP

- A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Demonstrate operation to Owner's maintenance personnel.

3.5 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Provide service and maintenance of packaged roof top units for one year year from Date of Substantial Completion.
- C. Provide routine maintenance service with a two month interval as maximum time period between calls.
- D. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibration.
- E. After each service call, submit copy of service call work order or report that includes description of work performed.

END OF SECTION

SECTION 23 81 29
VARIABLE REFRIGERANT VOLUME (VRV) HVAC SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air-source outdoor units.
- B. Refrigerant piping.
- C. Indoor units.
- D. Controls.

1.2 RELATED REQUIREMENTS

- A. Section 22 10 05 - Plumbing Piping and Specialties: Condensate drain piping.
- B. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
- C. Section 23 07 19 - HVAC Piping Insulation.

1.3 REFERENCE STANDARDS

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.
- B. AHRI 1230 - Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-conditioning and Heat Pump Equipment; 2014, with Addendum 1.
- 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. ITS (DIR) - Directory of Listed Products; current edition.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's standard data sheets showing the following for each item of equipment, marked to correlate to equipment item markings indicated in Contract Documents:
 - 1. Control Panels: Complete data of controllers, input-output points, and zones.
- C. Operating and Maintenance Data:
 - 1. Manufacturer's complete standard instructions for each unit of equipment and control panel.
 - 2. Custom-prepared system operation, troubleshooting, and maintenance instructions and recommendations.
 - 3. Identification of replaceable parts and local source of supply.
- D. Manufacturer's qualification statement.

- E. Installer's qualification statement.
- F. Warranty: Executed warranty, made out in Owner's name.

1.5 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL) in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and shall bear the listed mark.
- B. All wiring shall be in accordance with the National Electric Code (NEC). The System shall be rated in accordance with Air Conditioning Refrigeration Institute (AHRI) Standard 1230 and bear the AHRI label.
- C. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
- D. All units must meet or exceed the 2010 Federal minimum efficiency requirements and the ASHRAE Std 90.1 I-P-2019 efficiency requirements for VRF systems. Efficiency shall be published in accordance with the Air-Conditioning, Heating, and Refrigeration Institute AHRI 1230.
- E. Manufacturer shall have a minimum of fifteen (15) years continuous experience providing VRF systems in the U.S. market.
- F. Installer Qualifications: Minimum five years experience trained and approved by manufacturer of equipment.
- G. System start-up supervision shall be a required service to be completed by the manufacturer or a duly authorized, competent representative that has been factory trained in system configuration and operation. The representative shall provide proof of manufacturer certification indicating successful completion within no more than two (2) years prior to system installation. This certification shall be included as part of the equipment and/or controls submittals.
- H. Manufacturer shall provide on-site supervision and commissioning services for the full duration of the project at no additional cost.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle equipment and refrigerant piping according to manufacturer's recommendations.

1.7 WARRANTY

- A. The units shall be covered by the manufacturer's limited warranty for a period of one (1) year parts and seven (7) year compressor to the Owner from date of installation. Manufacturer shall provide first year labor warranty running concurrent to first year parts warranty.
- B. Manufacturer shall provide 1st year labor warranty.
- C. Installing contractor shall meet manufacturer requirements to obtain extended manufacturer's limited parts and compressor warranty for a period of ten (10) years to the Owner from date of installation. This warranty shall not include labor.
- D. All manufacturer technical and service manuals must be readily available for download by any local contractor should emergency service be required. Registering and sign-in requirements which may delay emergency service reference are not allowed.

1.8 SYSTEM DESCRIPTION

- A. Variable Refrigerant Flow (VRF) HVAC system shall be a direct expansion (DX) Hitachi heat recovery system. The outdoor unit shall consist of one or more frames (modules) connected through common refrigerant piping and control communication wiring. Each system shall have single or multiple, inverter compressor(s). Each system shall be connected to multiple indoor units (ducted, non-ducted or mixed combinations) through a common refrigerant piping network and integrated system controls and communication network.
- B. Heat recovery systems shall be a three-pipe design with the system ability to heat or cool simultaneously. The outdoor unit shall be an air cooled condensing unit with vertical discharge that uses refrigerant R-410A. The condensing unit may connect an indoor evaporator capacity up to 150% of the condensing unit capacity without any special factory approval. All zones are each capable of operating separately with individual temperature control.
- C. Each indoor unit shall be controlled individually or as a group. Heat recovery systems shall operate in either the heating or cooling mode and shall support simultaneous heating and cooling mode.
- D. Two-pipe, heat recovery systems utilizing a lower temperature mixed liquid/gas refrigerant to perform heat recovery are not acceptable due to reduced heating capabilities.
- E. The Hitachi condensing unit shall be interconnected to Hitachi indoor units in accordance with Hitachi's engineering manual detailing each available indoor unit. The indoor units shall be connected to the condensing unit utilizing Hitachi's specified piping joints and headers to ensure correct refrigerant flow and balancing. T-style joints are not acceptable for a variable refrigerant system.
- F. Change-over Boxes shall be located as shown on the drawing(s). The Change-over Boxes shall control the operational mode of the subordinate indoor units.

1.9 INDOOR UNIT SYSTEM

- A. The system shall consist of multiple Hitachi VRF indoor units, branch joints and headers. T-style joints shall not be permitted due to the large pressure differential through these fittings. The sum of connected capacity of all indoor units shall range from 55% to 150% of outdoor rated capacity. Up to 150% shall be possible without any factory approval for all capacities.

1.10 OUTDOOR UNIT SYSTEM

- A. The Hitachi VRF outdoor unit shall be interconnected to the indoor units with capacities from 6,000 Btu/h to 96,000 Btu/h. Each Hitachi VRF indoor unit or selected group of indoor units shall be capable of operating independently and be able to provide set temperatures through a wide variety of control options including simplified wired, wired, wireless, central station, computerized controller, LONWorks adapter, or BACnet adapter; a VRF H-Link Smart Gateway (BACnet) – Metasys compatible device that makes Hitachi VRF viewable from all BACnet IP BMS/BAS systems; a Web interface and automatic point mapping to the BMS; a VRF Cloud Gateway Device – VRF accessed through mobile device (tablet/phone using Android/iOS operating system); and a VRF compatible with Nest thermostat.
- B. All components (compressor, controls, etc.) in the Outdoor Unit shall be easily accessible from the front for service/replacement.

1.11 HEATING DEFROST OPERATION

- A. The system shall have the ability to use a continuous heating defrost operation for multi-module system configurations.

1.12 PERFORMANCE

- A. The three-phase VRF system performance shall be rated in accordance with AHRI 1230 test conditions.
- B. The VRF system shall be listed in the AHRI directory.
- C. The system efficiency shall meet or exceed the following certified performance criteria:

System	EER		IEER		COP47		COP17	
	Ducted	Non-Ducted	Ducted	Non-Ducted	Ducted	Non-Ducted	Ducted	Non-Ducted
8T:HVAHR096B_2S	12.4	12.4	22.1	23.9	3.65	3.77	2.36	2.40
16T:HVAHR192B_2S	11.1	10.6	20.8	21.4	3.38	3.32	2.15	2.05
30T:HVAHR360B_2S	10.2	9.5	19.5	19.8	3.20	3.20	2.18	2.05
34T:HVAHR408B_2S	9.5	9.5	19.2	19.3	3.37	3.34	2.23	2.08

B. OPERATING TEMPERATURE RANGES

- D. The ambient air temperature operating ranges shall be as follows:

Category	Range (°F)
Cooling Standard Operating Range (DB)	23 – 122
Cooling Extended Operating Range (DB)	-10 - 109
Heating Operating Range (WB)	-13 - 59
Simultaneous Cooling/Heating Standard Operating Range (DB/WB)	23 to 75 / 22 to 59
Simultaneous Cooling/Heating Extended Operating Range (DB/WB)	-10 to 75 / -11 to 59
Cooling Mode - Indoor Temperature Range (WB)	59 – 73
Heating Mode - Indoor Temperature Range (DB)	59 - 80

- E. If an alternate equipment manufacturer is selected, the mechanical contractor shall provide, at their own risk and cost, all additional material and labor to meet ambient operating conditions and performance.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

- A. Direct Expansion (DX) Hitachi heat recovery system. www.hitachiaircon.com
- B. Or Approved Equal.
- C. Substitutions: See Section 01 60 00 - Product Requirements for substitution procedures.

2.2 REFRIGERANT PIPING

- A. All refrigerant piping shall be installed in accordance with manufacturer's recommendations. No additional sight glasses or filter/dryers shall be required. All field installed refrigerant piping shall be nitrogenized ACR copper tubing and shall meet ASTM B280. All branch piping joints shall be approved by the manufacturer.
- B. The three-phase VRF system shall be capable of the following refrigerant piping lengths:
 - 1. Total system piping length: 3,280 ft.
 - 2. Maximum piping length from refrigerant piping branch to indoor unit: 131 ft.
 - 3. Maximum piping length from first branch to furthest indoor unit: up to 295 ft.
 - 4. Maximum vertical separation from outdoor unit to indoor unit, when outdoor unit is above: 360 ft.
 - 5. Maximum vertical separation from outdoor unit to indoor unit, when outdoor unit is below: 360 ft.

2.3 DEVELOPMENT GENERATIONS

- A. All three-phase VRF outdoor units connected to the same piping system shall be from the same product development generation. Mixing of outdoor units from different development generations in the same piping system is not acceptable.
- B. Change-over Boxes and outdoor units in a system must be of the same product development generation.

2.4 LOW AMBIENT AIR TEMPERATURES

- A. Outdoor Unit shall be capable of continuous compressor operation between the following operating ambient air conditions. Operations outside of these conditions are possible and may involve non-continuous operations.
 - 1. Outdoor Unit:
 - a. Cooling: 23°F DB to 122°F DB (With optional snow hood kit Accessories from 14°F DB to 109°F DB, With optional damper kit Accessories from -10°F DB to 109°F DB)
 - b. Heating: -13°F WB to 59°F WB

2.5 CHANGE-OVER BOXES

- A. General:
 - 1. The change-over boxes are designed specifically for use with Hitachi VRF heat recovery system.
 - 2. The change-over boxes shall be factory assembled, wired, piped and run tested at the factory.
 - 3. Multiple indoor units may be connected to a port provided they are within the capacity range of the port.

B. Valves:

1. The unit shall be furnished with electronic expansion valves to control the direction of refrigerant flow in each branch. Use of solenoid valves shall not be acceptable due to noise.

2.6 INDOOR UNITS

A. 1-Way Cassette

1. General:
 - a. The unit shall have the ability to be recessed into the ceiling with a ceiling grill and shall be a 1-way air distribution type.
 - b. The unit shall be factory assembled, piped, and wired, as well as run tested at the factory.
 - c. The unit and refrigerant pipes will be charged with dehydrated air (nitrogen gas) prior to shipment from the factory.
 - d. The 1-way cassette shall be equipped with an electronic expansion valve.
 - e. All sizes of 1-Way Cassettes shall be equipped with a built-in condensate pump with 33.5" lift.
 - f. The unit shall have an automatic swing louver.
 - g. The 1-way cassette shall be available with optional energy saving motion and radiant heat sensor for optimized airflow and temperature control.
2. Performance:
 - a. Each 1-way cassette's performance is based on nominal operating conditions shown in mechanical schedules.
3. Unit Cabinet:
 - a. The unit cabinet shall be space saving and have the ability to be recessed into a ceiling.
 - b. The 1-way panel shall be affixed to the bottom of the unit allowing for 1-way airflow.
 - c. The 1-way cassette (without panel) shall be no larger than 9-1/4" x 35-7/16" x 27-5/16" and weigh no more than 57 lbs.
 - d. An outside air knockout shall exist to for branch ducting supply air.
4. Fan:
 - a. Unit shall be equipped with a brushless DC fan motor drive.
 - b. The 1-way cassette shall consist of four fan speeds including: low (Lo), medium (Me), high (Hi), and high 2 (Hi2).
5. Filter:
 - a. The standard 1" air filter shall be of a washable type.
6. Sound:
 - a. The 1-way cassette sound pressure shall range 27 dB (A) to 31 dB (A) at low speed.
7. Electrical:
 - a. The unit shall be 208-230V, 1 phase, 60 Hertz.
 - b. The 1-way cassette shall have an acceptable voltage range of 187-255V.
 - c. The control circuit between the units in the system shall use AWG18-2 type control wire.

B. 4-Way Cassette

1. General:
 - a. The unit shall have the ability to be recessed into the ceiling with a ceiling grill and shall be a 4-way air distribution type.
 - b. The unit shall be factory assembled, piped, and wired, as well as run tested at the factory.
 - c. The unit and refrigerant pipes will be charged with dehydrated air (nitrogen gas) prior to shipment from the factory.
 - d. The 4-way cassette shall be equipped with an electronic expansion valve.

- e. All sizes of 4-Way Cassettes shall be equipped with a built-in condensate pump with 33.5" lift.
 - f. The unit shall have an automatic louver control.
 - g. The 4-way cassette shall be able to be configured for 2-way or 3-way airflow as well.
 - h. The 4-way cassette shall be available with optional energy saving motion and radiant heat sensor for optimized airflow and temperature control.
- 2. Performance:
 - a. Each 4-way cassette's performance is based on nominal operating conditions shown in mechanical schedules.
 - 3. Unit Cabinet:
 - a. The unit cabinet shall be space saving and have the ability to be recessed into a ceiling.
 - b. The 4-way panel shall be affixed to the bottom of the unit allowing for 4-way airflow.
 - c. The 4-way cassette (without panel) shall be no larger than 11-3/4" x 33-1/16" x 33-1/16" and weigh no more than 57 lbs.
 - d. An outside air knockout shall exist to for branch ducting supply air.
 - 4. Fan:
 - a. Unit shall be equipped with a brushless DC fan motor drive.
 - b. The 4-way cassette shall consist of four fan speeds including: low (Lo), medium (Me), high (Hi), and high 2 (Hi2).
 - 5. Filter:
 - a. The standard 1" air filter shall be of a washable type.
 - 6. Sound:
 - a. The 4-way cassette sound pressure shall range 27 dB (A) to 37 dB (A) at low speed.
 - 7. Electrical:
 - a. The unit shall be 208-230V, 1 phase, 60 Hertz.
 - b. The 4-way cassette shall have an acceptable voltage range of 187-255V.
 - c. The control circuit between the units in the system shall use AWG18-2 type control wire.
- C. Wall Mount
- 1. General:
 - a. The unit shall be factory assembled, piped, and wired, as well as run tested at the factory.
 - b. The unit and refrigerant pipes will be charged with dehydrated air (nitrogen gas) prior to shipment from the factory.
 - c. The unit shall have an automatic wide angle louver control.
 - d. The unit shall have a removable front panel for easy cleaning.
 - e. The unit shall have an auto-swing function to ensure efficient air distribution and uniform temperature.
 - f. The unit shall have a built-in wireless sensor.
 - 2. Performance:
 - a. Each wall mount indoor unit's performance is based on nominal operating conditions shown in the mechanical schedules.
 - 3. Unit Cabinet:
 - a. The wall mount indoor unit shall be no larger than 13-1/8" x 45-9/32" x 9-21/32" and weigh no more than 37 lbs.
 - b. The unit shall be affixed to a separate galvanized steel back plate to secure the unit firmly to the wall.
 - 4. Fan:
 - a. Unit shall be equipped with a brushless DC fan motor drive.
 - b. The wall mount shall consist of four fan speeds including: low (Lo), medium (Me), high (Hi), and high 2 (Hi2).
 - 5. Filter:
 - a. The standard 1" air filter shall be of a washable type.

6. Sound:
 - a. The wall mount indoor unit sound pressure shall range 30 dB (A) to 41 dB (A) at low speed.
7. Electrical:
 - a. The unit shall be 208-230V, 1 phase, 60 Hertz.
 - b. The wall mount indoor unit shall have an acceptable voltage range of 187-255V.
 - c. The control circuit between the indoor units shall use AWG18-2 type control wire.
8. Piping:
 - a. Refrigerant and drain piping shall have the ability to be connected at the right, left or rear of the unit for ease of installation.

2.7 CONTROLLERS

A. CIW01-WIRED ZONE CONTROLLER

1. Backlit display
2. Built-in thermistor
3. Standard wall controller
4. Controls temperature, mode, fan speed
5. Seven-day timer with multiple setpoints
6. Controls up to 16 indoor units
7. Built-in 23-hour timer
8. Room name and service company name programmable
9. Help menus and error code diagnosis
10. Large LCD display permits users to see the operating conditions and settings
11. The timer can be set at half-hour intervals
12. Monitors the operating conditions in the system, and an alarm is issued if a problem occurs.
13. A "self-diagnosis function" checks for problems on:
 - a. printed boards in indoor and outdoor units
14. Temperature range limit
15. Individual function lockout. (mode, temperature, fan speed)

B. CCL01- LARGE CENTRAL CONTROLLER

1. Controls up to 64 groups of indoor units
2. (maximum 160 units)
3. Easy-to-use touchscreen interface
4. Color-coded graphics for quick reference
5. Set up to 10 on/off times per day
6. Up to 8 Large Controllers can be connected to the H-LINK II segment
7. External input/output terminals are provided as standard. External signals enable the following options:
 - a. Central operation/stop
 - b. Demand control
 - c. Emergency stop
 - 1) Central operation output
 - 2) Central alarm output
 - d. Control Functions
 - e. Run/Stop

C. CBN02 VRF SMART GATEWAY

1. Supports up to 64 VRF systems, up to 160 Indoor Units, and up to 200 total Indoor and Outdoor Units
2. Integrates with the Metasys and FX building automation systems
3. Integrates with third party building automation systems supporting the BACnet IP protocol
4. BACnet Gateway (B-GW) device profile
5. BACnet IP, (Annex J), BACnet Broadcast Management Device (BBMD)"

- 6. Connects up to 4 Large Central Controllers (CCCL01) simultaneously to the same H-LINK II segment
- 7. Includes a Wi-Fi antenna for access via Laptop, Smartphone, etc.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that required electrical services have been installed and are in the proper locations prior to starting installation.
- B. Verify that condensate piping has been installed and is in the proper location prior to starting installation.
- C. Notify Architect if conditions for installation are unsatisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install refrigerant piping in accordance with equipment manufacturer's instructions.
- C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).
- D. Coordinate with installers of systems and equipment connecting to this system.
- E. Contractor Responsibility Matrix:

DEVICE	FURNISHED BY	INSTALLED BY	WIRING BY
SPACE TEMPERATURE SENSOR	FACTORY	TCC	TCC
SUPPLY AIR TEMPERATURE SENSOR	FACTORY	TCC	TCC
CONTROL VALVE	FACTORY	MC	TCC
RETURN HUMIDITY SENSOR	TCC	TCC	TCC
CONDENSATE OVERFLOW PROTECTION	FACTORY	FACTORY	FACTORY
TCC: TEMPERATURE CONTROLS CONTRACTOR			
MC: MECHANICAL CONTRACTOR			
FACTORY: HEAT PUMP MANUFACTURING FACTORY			

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Provide manufacturer's field representative to inspect installation prior to startup.

3.4 SYSTEM STARTUP

- A. Provide manufacturer's field representative to perform system startup.
- B. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.

- C. Adjust equipment for proper operation within manufacturer's published tolerances.

3.5 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Clean exposed components of dirt, finger marks, and other disfigurements.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals for additional submittals.
- B. Demonstrate proper operation of equipment to Owner's designated representative.
- C. Demonstration: Demonstrate operation of system to Owner's personnel.
 - 1. Use operation and maintenance data as reference during demonstration.
 - 2. Briefly describe function, operation, and maintenance of each component.
- D. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.

3.7 PROTECTION

- A. Protect installed components from subsequent construction operations.
- B. Replace exposed components broken or otherwise damaged beyond repair.

END OF SECTION

SECTION 26 05 05
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition.

1.2 RELATED REQUIREMENTS

- A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

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. Coordinate utility service outages with utility company.
- C. 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.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

- D. 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.
- E. Disconnect and remove abandoned panelboards and distribution equipment.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- 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.

3.4 CLEANING AND REPAIR

- A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.
- B. Clean and repair existing materials and equipment that remain or that are to be reused.
- C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION

SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wire and cable for 600 volts and less.
- D. Wiring connectors.
- E. Electrical tape.
- F. Heat shrink tubing.
- G. Oxide inhibiting compound.
- H. Wire pulling lubricant.
- I. Cable ties.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 05 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- C. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. 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.
- B. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- C. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).
- D. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- E. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- F. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.

- G. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- I. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.
- J. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.
- K. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- M. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- N. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- O. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Most Recent Edition, Including All Revisions.
- P. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- Q. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- R. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- S. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- T. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors 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 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Manufactured Wiring System Shop Drawings: Provide plan views indicating proposed system layout with components identified; indicate branch circuit connections.
- D. 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.
- E. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.6 QUALITY ASSURANCE

- A. Comply with all requirements of the Energy Conservation Construction Code in the State of New York, including but not limited to US Department of Energy, IECC 2018, and ASHRAE 90.1, including all updates, revisions and amendments.
- B. Comply with requirements of NFPA 70.
- 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 conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Concealed Dry Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway or metal clad cable.
- E. Exposed Dry Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- F. Above Accessible Ceilings: Use only building wire with Type THHN/THWN insulation in raceway or metal clad cable.
- G. Wet or Damp Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- H. Exterior Locations: Use only building wire with Type THHN/THWN insulation in raceway.
- I. Underground Installations: Use only building wire with Type THHN/THWN insulation in raceway.
- J. Use solid conductors for all 12 AWG circuits. Use stranded conductors only for 10 AWG and larger.
- K. Use conductor not smaller than 16 AWG for control circuits.
- L. Use 10 AWG stranded conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
- M. Use 10 AWG stranded conductors for 20 ampere, 277 volt branch circuits longer than 150 feet.

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. Provide new conductors and cables manufactured not more than one year prior to installation.
- D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- E. Comply with NEMA WC 70.
- F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- H. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.
- 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:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
- 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. 240/120 V, 1 Phase, 3 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Neutral/Grounded: White.

- d. Equipment Ground, All Systems: Green.

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. Industrial Wire & Cable, Inc: www.iewc.com.
 - e. Southwire Company: www.southwire.com/#sle.
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Single conductor insulated wire.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN.

2.4 METAL-CLAD CABLE

- A. Manufacturers:
 - 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Southwire Company: www.southwire.com/#sle.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation: Type THHN or THHN/THWN.
- E. Provide dedicated neutral conductor for each phase conductor.
- F. Grounding: Full-size integral equipment grounding conductor.
- G. Armor: Steel, interlocked tape.
- H. Provide PVC jacket applied over cable armor for exterior installations, or where indicated or required for environment of installed location.

2.5 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.
- B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors; split bolt type.
 - a. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- D. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

- E. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 - 3. Copper Conductors 6 AWG and larger: Use mechanical connectors where connectors are required.
 - 4. Stranded Conductors: Use crimped terminals for connections to terminal screws.
- F. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- G. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- H. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
 - 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Mechanical Connectors: Provide bolted type or set-screw type.
 - 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Compression Connectors: Provide circumferential type crimp configuration.
 - 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- K. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
 - 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 ACCESSORIES

- A. Electrical Tape:
 - 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. 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.
 - 3. 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.
 - 4. 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.

5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
 6. 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. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- 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.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Wire Pulling Lubricant:
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Listed and labeled as complying with UL 267.
 3. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 4. Suitable for use at installation temperature.
- E. Cable Ties: Material and tensile strength rating suitable for application.
1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

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. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 4. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 5. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
 6. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among 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.
 7. Provide oversized neutral/grounded conductors where indicated and as specified below.
 - a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.
 - b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install metal-clad cable (Type MC) in accordance with NECA 120.
- E. 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.
- F. Exposed Cable Installation (only where specifically permitted):
1. Route cables parallel or perpendicular to building structural members and surfaces.
 2. Protect cables from physical damage.
- G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- H. 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.
- I. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

- J. Install conductors with a minimum of 12 inches of slack at each outlet.
- K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- M. 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.
 - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- N. 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 electrical tape.
 - 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.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - 3. Wet Locations: Use heat shrink tubing.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. 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.
- Q. Identify conductors and cables in accordance with Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.
- R. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- S. 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 01 40 00 - 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 only required for services and feeders. 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 26 05 26
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 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2007.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. 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. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
- C. Project Record Documents: Record actual locations of grounding electrode system components and connections.

- D. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

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.

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 System Resistance:
 - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
 - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
- F. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. 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.
 3. Concrete-Encased Electrode:
 - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of steel reinforcing bars embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
 4. Ground Ring:
 - a. Where location is not indicated, locate ground ring conductor at least 24 inches outside building perimeter foundation.
 - b. Provide connection from ground ring conductor to:
 - 1) Perimeter columns of metal building frame.
 - 2) Ground rod electrodes located at service entrance.
 5. Ground Rod Electrode(s):
 - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
 - b. Space electrodes not less than 10 feet from each other and any other ground electrode.
 - c. 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.
 6. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- 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.
 10. Provide bonding for metal siding not effectively bonded through attachment to metal building frame.
 11. Provide bonding and equipment grounding for pools and fountains and associated equipment in accordance with NFPA 70.

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 26 05 26:
 - 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).
 - 2. Wire: Stranded Copper.
- 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 bronze mechanical connectors for accessible connections.
 - a. Exceptions:
 - 1) Use exothermic welded connections for connections to metal building frame.
 - 4. Manufacturers - Mechanical and Compression Connectors:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Copperweld: www.copperweld.com.
 - c. Erico International: www.erico.com.
 - d. O-Z Gedney: www.emerson.com.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
 - 5. Manufacturers - Exothermic Welded Connections:
 - a. Copperweld: www.copperweld.com.
 - b. O-Z Gedney: www.emerson.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Ground Rod Electrodes:
 - 1. Comply with NEMA GR 1.
 - 2. Material: Copper.
 - 3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.
 - 4. Manufacturers:
 - a. Copperweld: www.copperweld.com.
 - b. Thomas & Betts
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

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 or provide ground plates.
 - 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 26 05 53.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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.
- F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 33.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 26 05 33.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- C. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

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 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.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
 - 2. Coordinate work to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
 - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
 - 5. Notify Architect of 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.

1.5 SUBMITTALS

- A. See Section 01 30 00 - 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, and post-installed concrete/masonry anchors.
- C. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC (ICC-ES), provide current ICC-ES evaluation reports upon request.
- D. Installer's qualification statement.
- E. 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. Product Listing Organization Qualifications: Organization recognized by OSHA as 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 the following. Where requirements differ, comply with most stringent.
 - a. NFPA 70.
 - b. Requirements of authorities having jurisdiction.
 - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
 - 3. Provide products listed, classified, and labeled as suitable for 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. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 - 7. Steel Components: Use corrosion-resistant materials suitable for 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 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 and clamps suitable for conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
 - 1. Manufacturers:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Metal Channel/Strut Framing Systems:
 - 1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 - 2. Comply with MFMA-4.
 - 3. Channel Material:
 - a. Indoor Dry Locations: Use zinc-plated steel.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
 - 4. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
 - 5. Minimum Channel Dimensions: 1-5/8 inch wide by 13/16 inch high.
- 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. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch diameter.
 - c. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch diameter.
 - d. Trapeze Support for Multiple Conduits: 3/8-inch diameter.
 - e. Outlet Boxes: 1/4-inch diameter.
 - f. Luminaires: 1/4-inch diameter.
- F. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
 - 2. Concrete: Use 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. Steel: Use beam clamps or machine bolts.
 - 7. Sheet Metal: Use sheet metal screws.
 - 8. Wood: Use wood screws.
 - 9. Powder-actuated fasteners are permitted only as follows:
 - a. Use only threaded studs; do not use pins.
 - 10. Hammer-driven anchors and fasteners are not permitted.
 - 11. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
 - b. Comply with MFMA-4.
 - c. Channel Material: Use galvanized steel.
 - d. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.
 - 12. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

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 hangers and supports in accordance with NECA 1.
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. 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.
 - a. Minimum standoff: 1 inch.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
 - 5. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
 - 6. Install surface-mounted cabinets and panelboards with minimum of four anchors.
 - 7. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- I. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- J. Secure fasteners in accordance with manufacturer's recommended torque settings.
- K. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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 26 05 33.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Stainless steel rigid metal conduit (RMC).
- C. Galvanized steel intermediate metal conduit (IMC).
- D. Stainless steel intermediate metal conduit (IMC).
- E. PVC-coated galvanized steel rigid metal conduit (RMC).
- F. Flexible metal conduit (FMC).
- G. Liquidtight flexible metal conduit (LFMC).
- H. Galvanized steel electrical metallic tubing (EMT).
- I. Stainless steel electrical metallic tubing (EMT).
- J. Rigid polyvinyl chloride (PVC) conduit.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 07 84 00 - Firestopping.
- C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.
- D. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- E. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- F. Section 26 05 33.16 - Boxes for Electrical Systems.
- G. Section 26 05 53 - 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); 2015.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC); 2005.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

- G. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2018.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2016.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- M. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.
- N. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- O. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- P. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- Q. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- R. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- S. UL 797A - Electrical Metallic Tubing - Aluminum and Stainless Steel; Current Edition, Including All Revisions.
- T. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
 - 5. Notify Architect of 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 between termination points is complete.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2-inch (53 mm) trade size and larger.

1.6 QUALITY ASSURANCE

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- B. Work shall be inspected by a local Authority Having Jurisdiction (AHJ). Contractor shall provide certificate of inspection prior to final payment request.

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, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Under Slab on Grade: Use galvanized steel rigid metal conduit.
 - 2. Exterior, Direct-Buried: Use rigid PVC conduit.
 - 3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
 - 4. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), stainless steel intermediate metal conduit (IMC), or schedule 80 rigid PVC conduit where emerging from underground.
 - 5. Where rigid polyvinyl (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit (RMC) elbows, stainless steel rigid metal conduit (RMC) elbows, galvanized steel intermediate metal conduit (IMC) elbows, stainless steel intermediate metal conduit (IMC) elbows, PVC-coated galvanized steel rigid metal conduit (RMC) elbows, or concrete-encased PVC elbows for bends.
- D. Embedded Within Concrete:
 - 1. Within Slab on Grade: Use rigid PVC conduit.
 - 2. Within Slab Above Ground: Use rigid PVC conduit.
 - 3. Within Concrete Walls Above Ground: Use rigid PVC conduit.
 - 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), stainless steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) where emerging from concrete.
- E. Concealed Within Masonry Walls: Use electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), stainless

steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).

- I. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
 - 1. Locations subject to physical damage include, but are not limited to:
 - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit.
- L. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
 - 1. Maximum Length: 6 feet.
- M. Flexible Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit (FMC).
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
 - 3. Maximum Length: 6 feet unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- N. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).

2.2 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. 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 mandrel through them.
- C. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for 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 trade size.
 - 3. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
 - 4. Underground, Interior: 3/4-inch trade size.
 - 5. Underground, Exterior: 3/4 inch (21 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. Picoma: www.picoma.com.
 - 3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
 - 4. Substitutions: See Section 01 60 00 - 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. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
3. Material: Use steel.
4. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.4 STAINLESS STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC stainless steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6A.
- B. Fittings:
 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6A.
 2. Material: Use stainless steel with corrosion resistance equivalent to conduit.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.5 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.6 STAINLESS STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.

2.7 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil, 0.040 inch.
- C. PVC-Coated Boxes and Fittings:
 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 2. Nonhazardous Locations: Use boxes and fittings listed and labeled as complying with UL 514A, UL 514B, or UL 6.
 3. Material: Use steel or malleable iron.
 4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil, 0.040 inch.

- D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil, 0.015 inch.

2.8 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.
- 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.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.9 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 01 60 00 - 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, LLC: www.bptfittings.com/#sle.
 - b. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use aluminum.

2.10 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular/#sle.
 - 3. Wheatland Tube Company: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type EMT galvanized 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, LLC: www.bptfittings.com/#sle.
 - b. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 - c. Substitutions: See Section 01 60 00 - 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.

2.11 STAINLESS STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT stainless steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797A.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Connectors and Couplings: Use compression/gland or set-screw type.

2.12 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 - 1. Cantex Inc: www.cantexinc.com/#sle.
 - 2. JM Eagle: www.jmeagle.com/#sle.
 - 3. Picoma: www.picoma.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 80 unless otherwise indicated; rated for use with conductors rated 90 degrees C, schedule 40 not permitted.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.13 ACCESSORIES

- A. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- B. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.
- C. Sealing Compound for Hazardous/Classified Location Sealing Fittings: Listed for use with particular fittings to be installed.
- D. Sealing Systems for Concrete Penetrations:
 - 1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
 - 2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.
- E. Bore Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for installation within casing; furnished with roller wheels to facilitate installation, openings to facilitate grout flow, and holes for stabilization cable; suitable for casing and conduit/duct arrangement to be installed.
 - 1. Products:
 - a. Advance Products & Systems, LLC; Bore Spacers: www.apsonline.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

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. Where conduit is installed on an existing wall, paint conduit to match the wall finish.
- C. Install conduit in accordance with NECA 1.
- D. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- E. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- F. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by manufacturer.
- G. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- H. 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 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. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 - 6. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 7. Arrange conduit to provide no more than the equivalent of three 90 degree bends between pull points.
 - 8. Route conduits above water and drain piping where possible.
 - 9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 - 10. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
 - 11. 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.
 - 12. Group parallel conduits in same area on common rack.
- I. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 05 29.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. 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.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

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 of spring steel conduit clips for support of conduits is not permitted.
 9. Use of wire for support of conduits is not permitted.
- J. Connections and Terminations:
1. Use approved zinc-rich paint or 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 or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 7. Secure joints and connections to provide mechanical strength and electrical continuity.
- K. 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. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 6. 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.
 7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 07 84 00.
- L. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
1. Secure conduits to prevent floating or movement during pouring of concrete.
- M. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide minimum concrete cover of 3 inches on all sides unless otherwise indicated; see Section 03 30 00.
- N. 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 calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- O. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where service conduits enter building from underground distribution system.

- c. Where conduits enter building from underground.
- d. Where conduits may transport moisture to contact live parts.
- 2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- P. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- Q. Provide grounding and bonding; see Section 26 05 26.
- R. Identify conduits; see Section 26 05 53.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- D. 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 26 05 33.16
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. Boxes and enclosures for integrated power, data, and audio/video.
- D. Floor boxes.
- E. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- C. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- D. Section 26 05 33.13 - 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 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 27 26 - Wiring Devices:
 - 1. Wall plates.
 - 2. Floor box service fittings.
 - 3. Additional requirements for locating boxes for wiring devices.

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; 2010.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

- I. UL 508A - UL Standard for Safety Industrial Control Panels; 2018.
- J. UL 514A - Metallic Outlet Boxes; 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 01 30 00 - 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. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Keys for Lockable Enclosures: Two of each different key.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. 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 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 aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
 4. Use suitable concrete type boxes where flush-mounted in concrete.
 5. Use suitable masonry type boxes where flush-mounted in masonry walls.
 6. Use raised covers suitable for the type of wall construction and device configuration where required.
 7. Use shallow boxes where required by the type of wall construction.
 8. Do not use "through-wall" boxes designed for access from both sides of wall.
 9. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 10. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 11. 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.
 12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 13. Wall Plates: Comply with Section 26 27 26.
 14. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- 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 4, 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 sectionalized screw-cover or hinged-cover enclosures.
 4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
 5. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.
 - c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

- D. Floor Boxes:
 - 1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 27 26; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
 - 2. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
 - 3. Manufacturer: Refer to floor box schedule on drawings for additional information.

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. Unless dimensioned, box locations indicated are approximate.
 - 2. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26.
 - 3. Locate boxes so that wall plates do not span different building finishes.
 - 4. Locate boxes so that wall plates do not cross masonry joints.
 - 5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 - 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. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
 - 8. 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.

- b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
 - 9. 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 26 05 33.13.
 - 10. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
 - a. Concealed above accessible suspended ceilings.
 - b. Within joists in areas with no ceiling.
 - c. Electrical rooms.
 - d. Mechanical equipment rooms.
 - I. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure. 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.
 - 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
 - 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. Install boxes as required to preserve insulation integrity.
 - M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
 - N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
 - O. Close unused box openings.
 - P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
 - Q. Provide grounding and bonding in accordance with Section 26 05 26.
 - R. Identify boxes in accordance with Section 26 05 53.
- 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 26 05 53
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. Underground warning tape.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- B. Section 26 27 26 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.

1.3 REFERENCE STANDARDS

- A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 70E - Standard for Electrical Safety in the Workplace; 2018.

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 01 30 00 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- 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.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.7 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - 2. In addition to identifying data specific to individual pieces of equipment listed, each equipment identification nameplate or label shall include a date of installation in a MM/YYYY format.
 - a. Switchgear:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Use identification nameplate to identify load(s) served for each branch device. Identify spares and spaces.
 - b. Switchboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Use identification nameplate to identify load(s) served for each branch device. Identify spares and spaces.
 - c. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location.
 - 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.
 - d. Transformers:
 - 1) Identify kVA rating.
 - 2) Identify voltage and phase for primary and secondary.
 - 3) Identify power source and circuit number. Include location.
 - 4) Identify load(s) served. Include location.
 - e. 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.
 - 3. 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.
4. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
 - a. Minimum Size: 3.5 by 5 inches.
 - b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
 - c. Service Equipment: Include the following information in accordance with NFPA 70, 110.16.
 - 1) Nominal system voltage.
 - 2) Available fault current.
 - 3) Clearing time of service overcurrent protective device(s).
 - 4) Date label applied.
- B. Identification for Conductors and Cables:
 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
 2. 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.
 3. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.
 4. Use underground warning tape to identify direct buried cables.
- C. Identification for Devices:
 1. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.
 2. Use identification label to identify fire alarm system devices.
 3. Use identification label to identify serving branch circuit for all receptacles.
- D. Identification for Luminaires:
 1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 1. Manufacturers:
 - a. Brimar Industries, Inc: www.brimar.com/#sle.
 - b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - c. Seton Identification Products: www.seton.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Materials: Conform to ASTM D709
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic nameplates suitable for exterior use.
 3. Plastic Nameplates: Three-layer laminated acrylic with beveled edges; minimum thickness of 1/8 inch; engraved text.
 - a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
 - b. Color: Black letters on white background.
 4. Letter Size: Use 1/4 inch letters for identifying grouped equipment and loads.

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. Manufacturers:
 - a. Brady Corporation: www.bradyid.com/#sle.
 - b. Brother International Corporation: www.brother-usa.com/#sle.
 - c. Panduit Corp: www.panduit.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
 - a. Use 3/16 inch black letters on clear background. Use only for identification of individual wall switches and receptacles, control device stations

2.3 WIRE AND CABLE MARKERS

A. Manufacturers:

1. Brady Corporation: www.bradyid.com/#sle.
2. Seton Identification Products: www.seton.com.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

2.4 UNDERGROUND WARNING TAPE

A. Manufacturers:

1. Brady Corporation: www.bradyid.com/#sle.
2. Seton Identification Products: www.seton.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Materials: Use foil-backed detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

C. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.

D. Legend: Type of service, continuously repeated over full length of tape.

E. Color:

1. Tape for Buried Power Lines: Black text on yellow background.
2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean and degrease 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: Inside of equipment door.
 - 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. Conductors and Cables: Legible from the point of access.
 - 8. 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 6 inch(es) below finished grade.
 - 1. At paved areas, install 3 inches below pavement section.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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 26 05 83
WIRING CONNECTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical connections to equipment.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 26 05 33.13 - Conduit for Electrical Systems.
- C. Section 26 05 33.16 - Boxes for Electrical Systems.
- D. Section 26 27 26 - Wiring Devices.
- E. Section 26 28 16.16 - Enclosed Switches.

1.3 REFERENCE STANDARDS

- A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
- B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
 - 2. Determine connection locations and requirements.
- B. Sequencing:
 - 1. Install rough-in of electrical connections before installation of equipment is required.
 - 2. Make electrical connections before required start-up of equipment.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- 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.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

- 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 MATERIALS

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
 - 1. Colors: Comply with NEMA WD 1.
 - 2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
 - 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
- B. Disconnect Switches: As specified in Section 26 28 16.16 and in individual equipment sections.
- C. Wiring Devices: As specified in Section 26 27 26.
- D. Flexible Conduit: As specified in Section 26 05 33.13.
- E. Wire and Cable: As specified in Section 26 05 19.
- F. Boxes: As specified in Section 26 05 33.16.

2.2 EQUIPMENT CONNECTIONS

- A. Refer to equipment Schedules on drawing for specific requirements for each piece of equipment.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 09 23
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vacancy sensors.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- C. Section 26 05 33.16 - Boxes for Electrical Systems.
- D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. ANSI C136.24 - American National Standard for Roadway and Area Lighting Equipment - Nonlocking (Button) Type Photocontrols; 2004 (R2010).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of wall switch vacancy sensors with actual installed door swings.
 - 2. Coordinate the placement of vacancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
 - 3. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
 - 4. Notify Architect/Engineer of any conflicts or deviations from the 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 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

1. Vacancy Sensors: Include detailed motion detection coverage range diagrams.
 - C. Operation and Maintenance Data: Include detailed information on device programming and setup.
- 1.6 QUALITY ASSURANCE
- A. Comply with requirements of NFPA 70.
- 1.7 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.
- 1.8 FIELD CONDITIONS
- A. Maintain field conditions within manufacturer's required service conditions during and after installation.
- 1.9 WARRANTY
- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

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.

2.2 VACANCY SENSORS

- A. Manufacturers:
 1. Hubbell Incorporated: www.hubbell.com/#sle.
 2. Substitutions: See Section 01 60 00 - Product Requirements.
 3. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.
- B. All Vacancy 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 Vacancy Sensors: Designed to detect vacancy 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, load to be manual on and automatic off when no occupant presence is detected during an adjustable turn-off delay time interval.
 5. Dual Technology Vacancy 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. Sensitivity: Field adjustable.
 9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
 10. Load Rating for Line Voltage Vacancy Sensors: As required to control the load indicated on drawings.
 11. Provide with auxiliary relay: SPDT dry contacts.
- C. Wall Switch Vacancy Sensors:
1. All Wall Switch Vacancy Sensors:
 - a. Description: Vacancy 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. Unless otherwise indicated or required to control the load indicated on drawings, provide line voltage units with self-contained relay.
 - c. Operation: Operates only as vacancy sensor (manual-on/automatic-off) in accordance with California Title 24 requirements.
 - d. Finish: Match finishes specified for wiring devices in Section 26 27 26, unless otherwise indicated. Cover plate shall be stainless steel to match other wiring devices.
 - e. Provide with auxiliary relay: SPDT dry contact
 2. Passive Infrared/Ultrasonic Dual Technology Wall Switch Vacancy Sensors: Capable of detecting motion within an area of 900 square feet.
- D. Ceiling Mounted Vacancy Sensors:
1. All Ceiling Mounted Vacancy Sensors:
 - a. Description: Low profile vacancy 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. Finish: White unless otherwise indicated.
 - d. Provide with auxiliary relay: SPDT dry contact
 2. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Vacancy Sensors:
 - a. Standard Range Sensors: Capable of detecting motion within an area of 1000 at a mounting height of 9 feet, with a field of view of 360 degrees.
 - 1) Products:
 - (a) Hubbell NXOS series.
 - (b) Substitutions: See Section 01 60 00 - Product Requirements.
- E. Power Packs for Low Voltage Vacancy Sensors:
1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage vacancy 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 26 05 33.16 as required for installation of lighting control devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switch Vacancy Sensors: 48 inches above finished floor.
 - 2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
 - 3. Locate wall switch vacancy sensors 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.
- 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. Provide required supports in accordance with Section 26 05 29.
- G. 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.
- H. Identify lighting control devices in accordance with Section 26 05 53.
- I. Vacancy 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 vacancy 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. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.
- L. 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 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect each lighting control device for damage and defects.
- C. Test vacancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area.
- 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 vacancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.
- C. Adjust position of directional vacancy sensors and outdoor motion sensors to achieve optimal coverage as required.
- D. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology vacancy 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 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate proper operation of lighting control devices to Architect, and correct deficiencies or make adjustments as directed.
- D. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. Provide minimum of two hours of training.
 3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.
 4. Location: At project site.

END OF SECTION

SECTION 26 24 16
PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.
- C. Overcurrent protective devices for panelboards.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

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); 2018.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
- G. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 67 - Panelboards; Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.
- N. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- O. 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 01 30 00 - 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. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- D. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - 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. 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.

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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. ABB/GE: www.geindustrial.com/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- D. Substitutions: See Section 01 60 00 - Product Requirements.
- E. 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. 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.
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- G. 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 solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. 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.
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - 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.
- J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.3 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution 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 and Neutral Bus Material: Copper.
 - 2. Ground Bus Material: Copper.
- D. Circuit Breakers:
 - 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
 - 2. Provide thermal magnetic circuit breakers unless otherwise indicated.
- E. Enclosures:
 - 1. Provide surface-mounted enclosures unless otherwise indicated.
 - 2. Fronts: Provide door-in-door trim with 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 metal circuit directory holder mounted on inside of door.

2.4 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.
 - a. Provide insulated ground bus where indicated.
- 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 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 metal circuit directory holder mounted on inside of door.

2.5 OVERCURRENT PROTECTIVE DEVICES

A. 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) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - 2) 14,000 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: Aluminum, suitable for terminating aluminum or copper conductors.
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.
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 setting dial.
 - 2) Long time delay.
 - 3) Short time pickup and delay.
 - 4) 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. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
8. Provide type HACR for air conditioning equipment circuits.
9. Do not use tandem circuit breakers.
10. 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.

2.6 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - 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 26 05 29.
- 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.
- J. Provide grounding and bonding in accordance with Section 26 05 26.
- K. Install all field-installed branch devices, components, and accessories.
- L. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
- M. Provide filler plates to cover unused spaces in panelboards.
- N. Identify panelboards in accordance with Section 26 05 53.
- O. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Perform field inspection and testing in accordance with Section 01 40 00.
- C. Inspect and test in accordance with NETA ATS, except Section 4.
- D. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- E. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers. Tests listed as optional are not required.
- 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 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Wall plates and covers.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 33.16 - Boxes for Electrical Systems.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.

1.3 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2017h.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); 2017g.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
- 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 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.
- 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 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.

2.2 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: color selection by architect with stainless steel wall plate.

2.3 WALL SWITCHES

- A. Manufacturers:

1. Hubbell Incorporated: www.hubbell.com/#sle.
 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 3. Substitutions: See Section 01 60 00 - Product Requirements.
- 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. Manufacturers:
1. Leviton Manufacturing Company, Inc; IP710-LFZ series: www.leviton.com/#sle.
 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. 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.
- C. Control: Slide control type with separate on/off switch.
- D. Power Rating, Unless Otherwise Indicated or Required to Control the Load Indicated on the Drawings:
1. LED: 1200 VA.

2.5 RECEPTACLES

- A. Manufacturers:
1. Hubbell Incorporated: www.hubbell.com/#sle.
 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
 4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
 5. Substitutions: See Section 01 60 00 - Product Requirements.
- 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.
- C. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SD 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: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.
- E. USB Charging Devices:
1. USB Charging / Receptacle Combination Devices: Two-port (1 type A and 1 type C) USB 3.1 charging device and receptacle, commercial specification grade, duplex, 20A, 125V, NEMA 5-20R; rectangular decorator style.

2.6 WALL PLATES AND COVERS

- A. 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.
- B. Basis of Design: Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
1. Material type and color to be selected and approved by Owner and Architect.
- C. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed. Hubbell #WP8M or approved equal.
- D. Weatherproof Covers for Wet 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. Hubbell #WP26M or approved equal.

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 26 05 33.16 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. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- G. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- 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 26 05 53.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch 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 26 28 13
FUSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fuses.

1.2 RELATED REQUIREMENTS

- A. Section 26 28 16.16 - 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 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

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. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 APPLICATIONS

- A. Feeders:
 - 1. Fusible Switches up to 600 Amperes: Class RK1, 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.

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 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.

END OF SECTION

SECTION 26 28 16.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Enclosed safety switches.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 28 13 - 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); 2018.
- 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 01 30 00 - 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.

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.

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. Eaton Corporation; Cutler Hammer: www.eaton.com/#sle.
- B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- C. Siemens Industry, Inc: www.usa.siemens.com/#sle.
- D. Substitutions: See Section 01 60 00 - 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. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
- I. Conductor Terminations: Suitable for use with the conductors to be installed.
- J. Provide solidly bonded equipment ground bus in each enclosed safety switch, 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 3R.
 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
- L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- M. Heavy Duty Switches:
 1. Comply with NEMA KS 1.
 2. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

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 26 05 29.
- 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 26 05 26.
- H. Provide fuses complying with Section 26 28 13 for fusible switches as indicated or as required by equipment manufacturer's recommendations.
- I. Identify enclosed switches in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior luminaires.
- B. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- B. Section 26 05 33.16 - Boxes for Electrical Systems.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 27 26 - Wiring Devices: Manual wall switches and wall dimmers.

1.3 REFERENCE STANDARDS

- A. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.
- B. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.
- C. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

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. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. 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.

- C. 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.
- D. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- E. 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. 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.

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 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

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 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 Sloped Ceilings: Provide suitable sloped ceiling adapters.

2.3 ACCESSORIES

- A. Chain hang pendant luminaires in utilitarian spaces.
- B. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

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 26 05 33.16 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 26 05 29.
- 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.
- 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.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - 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. 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.

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 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Just prior to Substantial Completion, replace all lamps that have failed.

3.8 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

3.9 ATTACHMENTS

- A. Luminaire schedule located on contract drawings.

END OF SECTION

SECTION 27 05 26
GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Telecommunications Equipment Bonding Conductors.
- B. Beam Grounding Clamps.
- C. Bonding Hardware.
- D. Lightning Protection.
- E. Wire.
- F. Mechanical connectors.

1.2 RELATED REQUIREMENTS

- A. Section 27 05 28 - Pathways For Communications Systems.
- B. Section 27 05 53 - Identification For Communications Systems.
- C. Section 27 10 05 - Communications Copper Cabling.

1.3 REFERENCE STANDARDS

- A. BICSI TDMM - Telecommunications Distribution Methods Manual, 13th Edition; 2014.
- B. NECA/BICSI 607 - Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings; 2011.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d.
- E. UL 1581 - Reference Standard for Electrical Wires, Cables, and Flexible Cords; Current Edition, Including All Revisions.
- F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, For submittal procedures.
- B. Product Data: Submit product data on grounding and bonding equipment and connections.
- C. Test Reports: Indicate overall resistance to earth ground.
- D. Manufacturer's Installation Instructions: Submit for active electrodes.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.6 QUALITY ASSURANCE

- A. Provide grounding, surge protection and lightning protection of telecommunications system in accordance with latest version of Grounding, Bonding and Electrical Protection chapter of the BICSI TDMM Manual, TIA-607, and NFPA 70.
 - 1. Maintain one copy of each document on site.
- B. Assure that the "as installed" system is correctly and completely documented including engineering drawings, manuals, and operational procedures in such a manner as to support maintenance and future expansion of the system.
- C. Cables and cable assemblies shall be VW-1 flame rated and comply with UL 1581 and CSA Certified.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction, such as UL.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five years documented experience.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements, for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.10 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

- A. Panduit: www.panduit.com.
- B. Or Approved Equal.
- C. Substitutions: See Section 01 60 00 - Product Requirements, for substitution procedures.

2.2 SYSTEM DESCRIPTION

- A. The purpose of this grounding system is to create a low impedance path to earth ground for electrical surges and transient voltages. Lightning, fault currents, circuit switching (motors turning on and off), and electrostatic discharge (ESD) are common causes of these surges and transient voltages. An effective grounding system minimizes the detrimental effects of these electrical surges, which include degraded network performance and reliability and increased safety risks.
- B. The grounding system must be intentional, visually verifiable, adequately sized to handle expected currents safely, and directs these potentially damaging currents away from sensitive network equipment. As such, grounding must be purposeful in its design and installation. The following four issues require special consideration:
 - 1. Although AC powered equipment typically has a power cord that contains a ground wire, the integrity of this path cannot be easily verified. Thus, many equipment manufacturers require grounding above and beyond that which is specified by local electrical codes, such as the National Electrical Code. Always follow the grounding recommendations of the manufacturer when installing equipment.
 - 2. While the building steel and metallic water piping must be bonded to the grounding system for safety reasons, neither may be substituted for the telecommunications bonding backbone (TBB).
 - 3. Electrical continuity throughout each rack or cabinet is required to minimize safety risks. Hardware typically supplied with bolt-together racks is not designed for grounding purposes. Additionally, most racks are painted and paint is an insulator. Unless rack members are deliberately bonded, continuity between members is incidental, and in many cases, unlikely.
 - 4. Any metallic component that is part of the data center, including equipment, racks, ladder racks, enclosures, cable trays, etc. must be bonded to the grounding system.
- C. The communications grounding systems shall use the Building Grounding Electrode as the grounding element.
 - 1. The following elements shall not be acceptable as grounding electrodes:
 - a. Building Plumbing System.
 - b. Gas Piping System.
 - c. Fire Sprinkler System.

2.3 GENERAL

- A. Two-hole lugs shall be used wherever possible to resist loosening when twisted (bumped) or exposed to vibration. All lugs shall be irreversible compression and meet NEBS Level 3 as tested by Telcordia. Lugs with inspection windows shall be used in all non-corrosive environments so that connections may be inspected for full conductor insertion.
- B. Die index numbers shall be embossed on all compression connections to allow crimp inspection.

- C. Lugs, HTAPs, grounding strips, and busbars shall be UL Listed and made of premium quality tin-plated electrolytic copper that provides low electrical resistance while inhibiting corrosion.
- D. Antioxidant shall be used when making bonding connections in the field.

2.4 GROUNDING BUSBARS

- A. General:
 - 1. Meeting NECA/BICSI 607 and TIA-607 requirements for network systems bonding applications.
 - 2. Rectangular copper bar, tin-plated to inhibit corrosion.
 - 3. Pre-assembled mounting bracket, fully insulated from busbar.
 - 4. Pre-drilled paired holes to accommodate two hole lugs, quantity as determined by size of busbar required:
 - a. 1/4 inch stud holes, 5/8 inch on center.
 - b. 3/8 inch stud holes, 1 inch on center.
- B. Telecommunications Grounding Busbar
 - 1. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
 - 2. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.
- C. Telecommunications Main Grounding Busbar
 - 1. Ground Bar Size: 1/4 by 4 by 12 inches unless otherwise indicated or required.
 - 2. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.
- D. Retrofit Rack Grounding Busbar Kit
 - 1. For attachment to any existing rack or cabinet.
 - a. Length: 19 inches.
 - b. Provide attachment hardware for threaded rail or cage nut style, as appropriate.

2.5 GROUNDING AND BONDING WIRE

- A. All grounding and bonding conductors shall be insulated stranded copper wire.
 - 1. Jackets shall be VW-1 Flame Rated in accordance with UL 1581.
 - a. Color: Distinctive green or green/yellow.
- B. The Telecommunications Grounding Busbar (TGB) in each telecommunications space shall be grounded / earthed to the Telecommunications Main Grounding Busbar (TMGB) located at the service entrance. The gauge of the connecting copper ground / earth cable, known as the Telecommunications Bonding Backbone (TBB) shall follow BICSI TDMM Manual and TIA-607 guidelines, as is shown in the table below.

TBB Length in Linear feet	TBB Size (AWG)
Less than 13	6
14 - 20	4
21 - 26	3
27 - 33	2
34 - 41	1
42 - 52	1/0
53 - 66	2/0
Greater than 66	3/0

- C. The TMGB will be bonded to building steel and grounded to the electrical service ground according to BICSI TDMM Manual and TIA-607 guidelines. In telecommunications spaces with

only one rack, the rack jumper cable shall be connected directly to the TGB. The gauge of connecting copper ground cables shall be sized as shown in the table below.

Equipment / Purpose	Copper Cable Size (AWG)
Bonding conductor to each PDU or panel board serving the room	Size per NEC 250.122 and manufacturer requirements
Conduits, water pipes, and ducts	6
Bonding conductor to HVAC equipment	6
Cable trays / ladder racks	6
Building columns	4
Aisle grounds (over head or under floor) of the common bonding network	1/0

2.6 COMPRESSION LUGS

- A. Lugs shall meet NEBS Level 3 requirements as tested by Telcordia.
- B. Two hole lugs for connection of grounding wire to busbars, racks, cabinets, all data equipment, cable runway, building steel, etc.
 - 1. Combination hole and slot may be used for greater flexibility in connectivity.
 - a. Field modification of mounting holes shall not be accepted.
- C. Long barrel to maximize number of crimps and reduce pullout of copper conductors.
 - 1. Barrel shall have inspection window to ensure full conductor insertion.
 - 2. Ground conductor shall be fully crimped by compatible power crimper and dies.
 - a. Hand crimping of lugs shall not be accepted.
- D. Tin plated copper to inhibit corrosion.
- E. Product:
 - 1. Code Conductor Model: LCC-W Series

2.7 RACK / CABINET EQUIPMENT GROUNDING JUMPER CABLES

- A. Bolt-on bonding jumper that connects rack to the vertical rack grounding bar.
 - 1. Conductor: #6 AWG insulated stranded copper.
 - 2. Factory terminated with one straight slotted lug, and one 90 degree bent slotted lug.
 - 3. Length: 60 inches, minimum.
- B. Product:
 - 1. Equipment Jumper Kit Model RGEJ660U

2.8 VERTICAL RACK GROUND BAR KIT

- A. Tin plated copper conductor that attaches vertically to the rack equipment mounting rails to provide connection of rack mounted equipment with jumper to the telecommunications grounding busbar.
 - 1. 78.65 inch long, 0.67 inch wide, 0.05 inch thick, nominal.
- B. Product:
 - 1. Ground Bar Kit- Threaded Rail Model RGS134-1Y
 - 2. Ground Bar Kit- Cage Nut Rail Model RGS134B-1

2.9 LIGHTNING PROTECTION

- A. Category 6 Indoor Cabling

1. Emerson - Edco surge protective device for Category 6 PoE 10/100/1000 Base-T Ethernet lines. Model CAT6-POE-I
 - a. Provide mounting pad suitable for two-hole compression lug for connection to ground.
 - b. Do not use included Category 6 Cable, Use Panduit Patch Cable
 - c. Provide Panduit 36" Patch Cables (for Lightning Protection Device - 1 Per Data drop requiring lightning protection) Model UTPSP3ORY
- B. Category 6 Outdoor Cabling
 1. ITW Linx - Protects high-performance 4-pair CAT 6 Outside Plant Cables as well as CAT6 UTP cables for Power Over Ethernet applications (16V & 68V clamping). Using 110 punchdown In / Out. Model CAT6-POE

2.10 GROUNDING CLAMP FOR CONDUITS

- A. Dual rated for copper conductors to copper pipe, galvanized pipe or steel conduit.
- B. High strength aluminum alloy.
 1. Tin plated for corrosion and oxidation resistance.
- C. Product:
 1. Pipe Grounding Clamp (0.5" - 1" Pipe) Model GC-15A-Q
 2. Pipe Grounding Clamp (1.25" - 2" Pipe) Model GC-18A-X
 3. Pipe Grounding Clamp (2.5" - 4" Pipe) Model GC-22A-4

2.11 UNIVERSAL BEAM GROUNDING CLAMP

- A. Copper grounding clamp in conformance with UL 467.
 1. Provides mounting pad suitable for a two-hole compression lug.
 2. Suitable on steel flanges from 1/4 inch through 5/8 inch.
- B. Provide for any grounding connections made to beams.
- C. Product:
 1. Universal Beam Grounding Clamp Model GUBC500-6

2.12 SPLIT BOLT COPPER GROUNDING CLAMP

- A. High strength copper alloy.
 1. Pressure bar with hex nut tightening.
- B. Grounding connection for wire tray / baskets.
- C. Product:
 1. Split Bolt - Copper Model SBC3-C
 2. Split Bolt - Copper: Tin-Plated for galvanized Model SBCT3-C

2.13 BONDING HARDWARE KITS

- A. Bonding studs and nuts: Steel.
 1. Paint piercing serrations to create bonding point between the rack or cabinet and painted patch panels, mounted equipment, servers, busbars, and jumpers.
 2. Color: Green, to indicate bonding application.
- B. Product:
 1. Bonding Stud Kit:
 - a. For threaded #12-24 rail fasteners Model TRBSK
 - b. For threaded M6 rail fasteners Model TRBSM6K
 - c. For cage nut rail fasteners Model CGNBSK

- 2. Bonding Nuts:
 - a. For threaded #12-24 rail fasteners Model BGN-C
 - b. For cage nut rail fasteners Model BGN-C
 - c. For 1/4" thru-hole rail fasteners Model BGN-C
 - d. For threaded M6 rail fasteners Model BGNM6-C

2.14 PAINT PIERCING GROUNDING WASHER KIT

- A. Bonds frame members on bolt-together racks.
- B. Product:
 - 1. Paint Piercing Grounding Washer Kit Model RGW-100-1Y

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove paint, rust, mill oils, surface contaminants at connection points using an abrasive pad and provide antioxidant compound.
- B. Antioxidant shall be used when making all bonding connections in the field.

3.2 INSTALLATION

- A. Install in accordance with BICSI TDMM Manual, TIA-607, and NFPA 70.
- B. Install all components in accordance with manufacturer's installation instructions.
- C. Install all components of the grounding system in a manner so that they are intentional, visually verifiable, adequately sized to handle expected currents safely, and to direct potentially damaging currents away from sensitive network equipment.
- D. Install grounding for each rack / cabinet using 6 AWG THHN, rated for 90 degrees C, insulated, copper stranded conductor to copper communication grounding bus bar located in main telecommunications entrance facility.
- E. No "daisy chaining" of racks / cabinets, each rack / cabinet shall have it's own independent connection to the telecommunications grounding bar within the data room either through a main common bonding network or homerun.
- F. Bond main telecommunications grounding system to building grounding electrode system at main electrical service entrance location with 3/0 AWG copper stranded conductor.
- G. Install routing for grounding conductor as short and direct as practical.
- H. Install routing of bonding conductors with minimum number of bends and splices. Use sweeping bends.
- I. Position grounding busbars near associated equipment and insulate from supports.
- J. Ground data cabinets, racks, cable trays, air conditioning unit, building structure, metal piping and metal conduit located in all data rooms to the Telecommunications Grounding Busbar (TGB).
- K. Install ground from each piece of equipment to MDF Room and IDF Room to grounding bar via an insulated cable no smaller than 6 AWG stranded copper wire. Power crimp proper grounding lug on cable where connecting to grounding bar.

- L. Label grounding conductors and grounding bus bars in accordance with BICSI guidelines and Section 27 05 53 - Identification For Communications Systems.
- M. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. See Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- C. Visually inspect from each bus bar to main grounding electrode service location.
- D. Test in accordance with BICSI TDMM Manual, TIA-607 and NFPA 70.
- E. When improper grounding is found during testing, check entire project, perform corrections, and perform retesting.
- F. Installations not conforming to BICSI TDMM Manual, TIA-607 and NFPA 70 shall be subject to manufacturer grounding audit to identify correction requirements. Grounding audit and corrections required shall be at the expense of the contractor performing the improper installation.

END OF SECTION

SECTION 27 05 28
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cable Tray
- B. J-Hooks
- C. Cable Ties
- D. Conduit Sleeves
- E. Conduit Sleeve Fittings
- F. Bushings

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 27 05 26 - Grounding and Bonding For Communications Systems.

1.3 REFERENCE STANDARDS

- A. NEMA VE 1 - Metal Cable Tray Systems; 2017.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.
- D. NEMA VE 2 - Metal Cable Tray Installation Guidelines.
- E. ANSI/UL 5 - Surface Metal Raceways and Fittings.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. See Section 01 30 00 - Administrative Requirements for Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.5 SCOPE

- A. The Interior Communications Pathways will provide a distribution system for all system cabling that will be served by the systems shown on contract drawings. The pathways for a building may include all or some of the following, cable tray, continuous conduit systems, conduit stubs, sleeves, fire rated pathways, cable hangers, surface raceways. Interior pathway design shall follow all BICSI TDMM design recommendations and TIA568-B and TIA569-A standards.
 - 1. Cabling pathways will be concealed wherever possible.
 - 2. Corridors/Rooms/Spaces with inaccessible ceiling spaces (spline type ceilings, Hard ceilings) will require surface raceway on walls or ceilings.
 - 3. Exposed conduit and Raceway shall be run parallel and at right angles to building lines, and be painted to match existing surfaces.

1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for all products specified in this Section.
- C. Shop Drawings: Include plan views indicating locations and routing.
 - 1. Indicate proposed arrangement for Conduit pathway runs, Conduit Sleeve penetrations, and Conduits to be installed within structural concrete slabs (where permitted).
 - 2. Indicate proposed arrangement for J Hook pathways.
- D. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
- E. Project Record Documents: Record actual routing of Major Pathways and locations of supports for cable tray.

1.7 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 CABLE TRAY SYSTEM - GENERAL REQUIREMENTS

- A. Provide new cable tray system consisting of all required components, fittings, supports, accessories, etc. as necessary for a complete system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Do not use cable tray for applications other than as permitted by NFPA 70 and product listing/classification.
- D. Provide cable tray system and associated components suitable for use at indicated span/load ratings under the service conditions at the installed location.
- E. Unless otherwise indicated, specified span/load ratings are based on safety factor of 1.5 and working load only (no additional concentrated static load), with ratings for metal cable tray systems in accordance with NEMA VE 1.
- F. Unless otherwise indicated, specified load/fill depths and inside widths are nominal values, with values for metal cable tray systems in accordance with NEMA VE 1 including applicable allowable tolerances.

2.2 FIRE RATED CONDUIT PENETRATIONS

- A. Description: The firestop assembly for use in through-penetration firestop systems. The assembly shall be classified for use in one-, two-, three-, and four-hour rated gypsum, concrete and block walls and shall match the fire rating of the wall/floor that is being penetrated. The assembly shall be classified for use in one-, two-, and three-hour rated concrete floors. Firestop between wall opening and around outside of conduit sleeves with Firestop material per Section 07 84 00.

- B. Firestop Assembly(s) shall be in accordance with All applicable codes and Standards. Provide intumescent removable firestop forming material and putty around cables within conduit sleeves, or Fire Rated Conduit Sleeve Fittings for conduits 2" Dia. and above.
- C. All conduit sleeves to have bushings or fittings for cable protection.
- D. Provide acceptable grounding connection on conduit sleeves/bushings/fittings to allow for connection of ground wire per Sections 26 05 26, 27 05 26.

2.3 J-HOOKS

- A. Saddle style cable supports / hangers.
 - 1. Non-metallic cable support hook to prevent metal to cable contact, with integral cable retaining means.
 - 2. Appropriate metallic hanging means for attachment to walls, ceilings, threaded rods, beams or purlins.
 - 3. Tested and Listed in accordance with UL 2043 as suitable for use in air handling spaces.
 - 4. Bundle capacity: Two inches, minimum.
- B. Product:
 - 1. Panduit; J Pro Cable Support: www.panduit.com.
 - 2. Or Approved Equal
 - 3. Substitutions: Section 01 60 00 - Product Requirements.

2.4 CABLE TIES

- A. Reusable and releasable hook-and-loop style ties.
 - 1. Width: 0.75 inch, minimum.
 - 2. Operating range: -22 degrees F to 194 degrees F.
 - 3. Color: Black.
- B. Zip Ties shall not be permitted.

2.5 CONDUIT BUSHINGS

- A. Steel Conduit: Rigid Intermediate Grade, insulated, with screws or clips for ground wire connection
- B. PVC Conduit: non-steel, insulated

PART 3 EXECUTION

3.1 EXISTING CONDITIONS WORK

- A. Maintain access to existing cable tray and other pathway installations remaining active and requiring access. Modify installation or provide access panel to otherwise inaccessible spaces.
- B. All pathways shall be evaluated prior to adding any cabling within.
- C. Existing conduit sleeve pathways that are re-used shall not be filled beyond 40% fill factor and shall be firestopped. See Section 07 84 00 - Firestopping.
- D. Existing cable tray pathways that are re-used shall not be filled beyond 40% fill factor and where applicable at wall penetrations, shall be firestopped per applicable ratings and codes.

- E. Existing Conduit Sleeve penetrations that are abandoned shall be Firestopped/infilled per applicable ratings and codes.

3.2 INSTALLATION

- A. Support all pathways and fasten to structure with hardware specifically designed to support the total weight of the pathway and all included cables. Install supports at each connection point, at end of each run, and at other points to maintain the weight limit and to withstand cable pulling.
- B. Firestop Assembly(s) shall be labeled in accordance with UL F ratings and T ratings at both sides of penetration. Provide label on wall below / near the firestop assembly in a location that is easily seen.
- C. J Hooks: Install cable types in separate open cable hanger segment. Do not mix coaxial, optical fiber cable or any other cable type in the same support. If cables have more than 12 inches of sag, install additional J-Hooks. Cables to maintain minimum 4 inches above ceiling grid. At no point shall cable(s) rest on acoustic ceiling grids or panels.
- D. If a conduit run requires:
 - 1. More than two 90 degree bends, provide a pull point or pull box between sections with two bend or fewer.
 - 2. A reverse bend (between 100 degrees and 180 degrees) insert a pull point or pullbox at each bend having an angle from 100 degrees and 180 degrees.
 - 3. A third 90 degree bend (between pull points or pull boxes) Derate conduit capacity of the run that has the third bend by 15% except when:
 - a. the total run is not longer than 33 feet.
 - b. the conduit size is increased.
 - c. One of the bends is located within 12 inches of the cable end feed.
- E. Maintain Conduit Bend Radius:
 - 1. 4-pair balanced twisted pair (CAT 6) - 4 times the outside diameter (at rest or during pull).
 - 2. Multipair balanced twisted pair cable - 10 times the outside diameter.
 - 3. Telecommunications bonding backbone- 3 times the outside diameter.
- F. Where raceways or cable trays penetrate fire-rated walls, floors or roofs, sleeve and seal opening around raceways and cable trays with UL listed firestop assemblies equal to fire rating of walls, floors or roofs. Seal penetrations through all floors or roofs to provide and maintain a watertight installation. Conduit sleeves, where required, shall be sized for proper sealing and extend Min. 2 inches above the surface. The installation shall be in compliance with UL listed firestopping assembly.
- G. Conduits shall be:
 - 1. Clean dry and unobstructed
 - 2. Reamed and fitted with bushings. Metal conduits to have ground clip / ground wire connectors
 - 3. Labeled for identification
 - 4. Equipped with a pull cord that has a min. test rating of 90kg (200lb.)
- H. A pull cord that has a min. test rating of 90kg (200lb. shall be co-installed with all cable installed in any pathway.
- I. Cable pathways shall not be filled greater than the TIA/EIA-569-A maximum fill for the particular type.
- J. Pathways deemed overfilled upon installation will not be accepted and shall be remedied at Contractor expense.
- K. Install expansion connectors where recommended by manufacturer as indicated on Drawings.

- L. Install firestopping in accordance with Section 07 84 00 to sustain ratings when passing cable pathway through fire-rated elements.

3.3 CLOSEOUT ACTIVITIES

- A. See Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual routing of Major Pathways and locations of supports for cable tray.

END OF SECTION

SECTION 27 05 53
IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Labels
- B. Wire markers
- C. Conduit markers

1.2 RELATED REQUIREMENTS

- A. Section 27 05 26 - Grounding and Bonding For Communications Systems.
- B. Section 27 10 05 - Communications Copper Cabling.

1.3 REFERENCE STANDARDS

- A. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.
- B. TIA-606-B - Administration Standard for Telecommunications Infrastructure; Rev B, 2012 (with Addenda; 2015).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard product data sheet, including part number and description for each product
- C. Shop Drawings: Submit labeling plan for review and approval prior to commencing labeling.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

- A. Panduit: www.panduit.com.
- B. Or approved equal.
- C. Substitutions: See Section 01 60 00 - Product Requirements, for substitution procedures.

2.2 LABELS AND WIRE MARKERS

- A. Comply with the requirements of TIA-606 and TIA-606-B standards.
- B. Thermal transfer, laser, or inkjet type.
- C. Lettering: Black on white background.
 - 1. Sized according to label; not less than 1/8 inch.
- D. Application:
 - 1. Cat6/6A Cables Self Laminating Model S050X150YAJ

2. Faceplates	Non-Adhesive	Model UILS8BW
3. Patch Panels	Non-Adhesive	Model UILS8BW
4. Ground Busbars	Super-tack	Model C200X100YPT
5. Grounding/ Bonding Conductors	Tag	Model LTYK
6. Data Outlets	Non-Adhesive	Model C195X040Y1J
7. Security Cameras	Continuous tape	Model T038X000FJC-BK
8. Wireless Access Points	Continuous tape	Model T038X000FJC-BK
9. Speaker Cabling	Self Laminating	Model S050X150YAJ

2.3 CONDUIT AND RACEWAY MARKERS

- A. Vinyl snap-on, non-adhesive:
 - 1. Fiber Conduit and Innerduct Label Model PCV-FORY

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Follow manufacturer's requirements for preparation.
- C. Install identifying devices after completion of any painting.

3.2 INSTALLATION

- A. Follow manufacturer's requirements for installation.
- B. Mark data cabling within 2 inches from each end. Install additional marking at accessible locations along the cable run.
- C. All labels shall be installed such that they will be visible following installation.
 - 1. Install parallel to cables or equipment lines.
- D. Contractor shall install identification on all of the following:
 - 1. Copper Horizontal Cabling at each end.
 - 2. Data Outlets and connectors at each end.
 - 3. Copper Patch Panels.
 - 4. Communications Grounding Busbars.
 - 5. Communications Grounding and Bonding Conductors.
 - 6. Security Cameras.
 - 7. Wireless Access Points.
 - 8. Speaker Cabling.
- E. All labeling nomenclature shall comply with TIA-606-B cable labeling standards and as further outlined below:
 - 1. Data Outlets (any faceplate or surface mount box containing cat-6 data jacks)
 - a. Data outlet labels to indicate TR-RK-PP-PRT where:
 - 1) TR = 2-digit number of Telecommunications Room
 - 2) RK = 2-digit number of Rack
 - 3) PP = 2-digit number of Patch-Panel
 - 4) PRT = 2-digit number port designation of patch-panel
 - b. Data Outlets serving security cameras and wireless access points shall follow the same protocol outlined above.
 - 2. Security Camera Devices

- a. The label shall include the MAC address and the location of the Camera. If more than one camera is located in the same room or space, use -A, -B, -C, etc. at the end of the label.
- b. Example: xx:xx:xx:xx:xx:xx PH4SC215
 - 1) xx:xx: = MAC Address
 - 2) PH = Pocantico Hills
 - 3) 4 = IDF 4 (MDF shall be 1)
 - 4) SC = Security Camera
 - 5) 215 = Room that the Security Camera is in or near
3. Wireless Access Point Devices
 - a. The label shall include the MAC address and the location of the AP. If more than one access point is located in the same room or space, use -A, -B, -C, etc. at the end of the label.
 - b. Example: xx:xx:xx:xx:xx:xx PH4AP215
 - 1) xx:xx: = MAC Address
 - 2) PH = Pocantico Hills
 - 3) 4 = IDF 4 (MDF shall be 1)
 - 4) AP = Access Point
 - 5) 215 = Room that the Access Point is in or near
 - c. Example: xx:xx:xx:xx:xx:xx PH12AP406-A, PH12AP406-B, PH12AP406-C
 - 1) xx:xx: = MAC Address
 - 2) PH = Pocantico Hills
 - 3) 12 = IDF 12 (MDF shall be 1)
 - 4) AP = Access Point
 - 5) 406 = Room that the Access Point is in or near
 - 6) -A, -B, -C = 1st Access Point, 2nd Access Point, 3rd Access Point in room

END OF SECTION

SECTION 27 10 05
COMMUNICATIONS COPPER CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper communications cable and terminations.
- D. Copper Communications cable and interconnecting devices.
- E. Communications equipment room fittings.
- F. Communications outlets.
- G. Communications grounding and bonding.
- H. Communications identification.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 27 05 26 - Grounding and Bonding For Communications Systems.
- C. Section 27 05 28 - Pathways For Communications Systems.
- D. Section 27 05 53 - Identification For Communications Systems.
- E. Section 27 15 55 - Communications Cable Testing.

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; Revision E, 2005.
- C. FM (AG) - FM Approval Guide; current edition.
- D. ICEA S-90-661 - Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cables (With or Without An Overall Shield) For Use in General Purpose and LAN Communications Wiring Systems Technical Requirements; 2012.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air Handling Spaces.
- G. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2019.
- H. TIA-569 - Telecommunications Pathways and Spaces; 2019e.
- I. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.
- J. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d.

- K. UL (DIR) - Online Certifications Directory; Current Edition.
- L. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- M. 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 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages, specifications and data sheets for each product incorporated into the Work.
- C. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
- D. Evidence of qualifications for installer.
- E. Installer certification from the cable manufacturer MUST be submitted as part of the bid de-scoping process. The Certified Installer certificate cannot be site specific to this project and must be pre-existing for 12 months prior to the bid due date.
- 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 operation of product.
- G. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.
- H. Field Test Reports.
- I. 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.
- J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.6 QUALITY ASSURANCE

- A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

- B. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
 - C. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owner's representative.
 - D. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified, and subject to the approval of the Engineer.
 - E. Installer Qualifications:
 - 1. Company specializing in installing products specified in this section with minimum three years documented experience, and with service facilities within 120 miles of project. The contractor must be approved by the manufacturer for cabling solutions – a qualified BICSI trained installer who also is certified to install the solution able to be warrantied by the Manufacturer.
 - 2. The contractor is responsible for workmanship and installation practices in accordance with the Manufacturer's Certified Program. Contractor Project Manager on site must be manufacturer certified in the copper information transport systems to be installed. At least 30 percent of the installation and termination crew must be certified by Manufacturer with a Technicians Level of Training.
 - 3. Manufacturer accepted installer qualifications based on the following:
 - a. Panduit Corp.
 - 1) Panduit Certified Installer (PCI)
 - 2) Panduit Certified Technician (PCT)
 - b. Belden Partner Alliance Program
 - c. Legrand Ortronics
 - 1) Ortronics Certified Installer (CI)
 - 2) Ortronics Certified Technician (CIT)
 - F. Contractor must have 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. All Supervisors and a minimum of 30% of installers factory certified by manufacturers of products to be installed.
 - 3. Employing BICSI Registered Cabling Installation Technicians (RCIT) for supervision of all work.
 - 4. Provide evidence from at least two projects that have been in use for at least 18 months; submit project name, address, and written certification by user.
 - 5. Field technicians shall have a minimum of 3 years experience in the installation of the type of system specified.
 - G. Products: Listed, classified, and labeled as suitable for the purpose intended.
 - H. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
 - I. Conform to requirements of NFPA 70.
- 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 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.
- C. Manufacturer shall provide a complete Cable Products Static, Dynamic, and Applications Warranty for a period of 20 years for high performance cabling systems that meet application requirements. The warranty shall include all cable installed in the structured cabling system.
- D. Warranty shall be written in the name of the Owner, and include the following:
 - 1. Identification of the Manufacturer's Certified Installer.
 - 2. That the Installer has completed the Manufacturer's Certification Program.
 - 3. That the Installer has fulfilled all the requirements of the Manufacturer's Certified Program.

PART 2 PRODUCTS

2.1 CATEGORY 6A HORIZONTAL CABLE (PLENUM RATED)

- A. Product Description: Category 6A, 100-ohm, plenum rated cable, 23 AWG copper conductors twisted in 4 pairs and separated by a cross-divider. The cable shall be compliant with IEEE 802.3af and IEEE 802.3at POE applications. The cable shall be capable of 10GBase-T Ethernet.
- B. Manufacturers:
 - 1. Panduit CAT-6A Cable Model - PUP6AV04BU-G
 - 2. Belden CAT-6A Cable Model - 10GXS13D15A1000
 - 3. Berk-Tek CAT-6A Cable Model - 11082057
 - 4. Superior Essex CAT-6A Cable Model - 6S-220-2P
 - 5. General Cable CAT-6A Cable Model - 7151839
- C. Color:
 - 1. General Use Data Blue
 - 2. Wireless Access Points Blue
 - 3. Security Cameras Orange

2.2 CATEGORY 6A DATA JACKS

- A. Product Description: Augmented Category 6, 8-position, 8-wire universal module. Contacts plated with 50 micro inches of gold. Compatible with Mini-Com Modular Patch Panels, Faceplates, and Surface Mount Boxes. Terminates 4 pair 22-26 AWG, 100 ohm cable and shall not require the use of a punch down tool. Wiring Scheme: T568B
 - 1. Shuttered CAT6A Jacks to be used for all above ceiling applications unless otherwise noted.
 - 2. Corrosive Resistant Jacks to be used in harsh/humid environments.
- B. Manufacturers:
 - 1. CAT6A - Panduit Mini-Com TX6 10Gig Jack Model CJ6X88TG
 - 2. CAT6A - Panduit Mini-Com TX6 10Gig Shuttered Jack Model CJH6X88TG
 - 3. CAT6A - Belden CAT 6A REVConnect CAT6A Jack Bulk Model RVAMJKU
 - 4. CAT6A - Ortronics Clarity HDJ6A Jack Model OR-HDJ6A
- C. Color:
 - 1. General Use Data Blue
 - 2. Wireless Access Points Blue

3. Security Cameras

Orange

2.3 MANUFACTURERS' JACK COLOR CHART

COLOR	PANDUIT	BELDEN	ORTRONICS
BLUE	BU	BL	-36
ORANGE	OR	OR	-43
GREEN	GR	GN	-45
SLATE	IG	GY	-78
WHITE	WH	EW	-88
RED	RD	RD	-42
BLACK	BL	BK	0
YELLOW	YL	YL	-44
VIOLET	VL	PR	-27
IVORY	IW	IV	-13
ALMOND	EI	AL	

2.4 CATEGORY 6A PATCH CABLES

- A. Product Description: Category 6A, 28 AWG, 10 Gb/s UTP patch cord with TX6A 10Gig Modular Plugs on each end.
- B. Manufacturers:
1. Panduit Patch Cables (for Data Room End - 1 Per Data drop) Model UTP28X[X]**
 2. Panduit Patch Cables (for Device End - 1 Per Data drop) Model UTP28X[X]**
 3. Panduit 36" Patch Cables (for Surge Protection Device - 1 Per Data drop requiring surge protection) Model UTP6A3
 4. Belden Patch Cables (for Data Room End - 1 Per Data drop) Small Diameter Patch Cords (where xxx equals footage length) Model CAD11006xxx
 5. Belden Patch Cables (for Device End - 1 Per Data drop) Small Diameter Patch Cords (where xxx equals footage length) Model CAD11006xxx
 6. Belden Patch Cables (for Surge Protection Device - 1 Per Data drop requiring surge protection) Small Diameter Patch Cords (where xxx equals footage length) Model CAD11006004
 7. Ortronics Patch Cables (for Data Room End - 1 Per Data drop) Model OR-MC6A[xx]-06
 8. Ortronics Patch Cables (for Device End - 1 Per Data drop) Model OR-MC6A[xx]-06
 9. Ortronics 36" Patch Cables (for Surge Protection Device - 1 Per Data drop requiring surge protection) Model OR-MC6A03-03
- C. Lengths:
1. Data room end Locations with Data Cabinets 3 foot ([x] = 3)
 2. Data room end Locations with Data Racks 6 foot ([x] = 6)
 3. Wireless access point device location 6 foot ([x] = 6)
 4. Security Camera device location 6 foot ([x] = 6)
 5. General Data outlet location 10 foot ([x] = 10)
- D. Color:
1. General Use Data Blue
 2. Wireless Access Points Blue
 3. Security Cameras Orange
- E. Additional Installation notes:
1. Contractor to establish proper wire management for patch cables from patch panels to switches. "Spider Webbing" with patch cables will not be accepted.

2. Patch cables shall not be shorter than 36".

2.5 DATA FACEPLATES

- A. Product Description: Single gang vertical faceplate accepts two to six Mini-Com® Modules, includes label pockets.
- B. Manufacturers:
 1. Panduit Mini-Com Classic Series

a. Two Module	Model CFPSL2S
b. Four Module	Model CFPSL4S
c. Six Module	Model CFPL6SY
d. Provide Blank Modules for all unused module spaces.	Model CMBIG-X
e. Phone Wall Plate	Model KWP6PY
 2. Belden: Compatible with REVConnect jacks.

a. Two Port White	Model AX104231
b. Four Port White	Model AX 104232
c. Six Port White	Model AX 104233
d. Blank Inserts White	Model AX 104456
e. Phone Wall Plate	Model AX 104126
 3. Ortronics HDJ Clarity Series

a. Two Module	Model OR-403STJ12
b. Four Module	Model OR-403STJ14
c. Six Module	Model OR-40300457
d. Provide Blank Modules for all unused module spaces	Model 4100002-87
e. Phone Wall Plate	Model OR-403STJ1WP

2.6 DATA OUTLET BOXES

- A. Product Description: Shuttered surface mount box accepts up to two Modules.
- B. Manufacturers:
 1. Panduit Mini-Com Shuttered Surface Mount Box Model CBX2IW-AY

a. For all above ceiling terminations and/or outlet locations.	
--	--
 2. Belden Two-Port with Shuttered Door and ID Window Model AX102652

a. For all above ceiling terminations and/or outlet locations.	
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 3. Ortronics Clarity HDJ Surface Mount Boxes Model OR-PHAHJU48

a. For all above ceiling terminations and/or outlet locations.	
--	--
- C. Mounting:
 1. Panduit magnets to mount Surface Mount Boxes to structural steel or other permanent metal surface where possible. Model CBM-X
 2. Hook and Loop Cable ties may be used to mount Surface Mount Boxes where magnets cannot be used.
 3. Wall anchors may be used where the Surface Mount Box is located in an exposed area (such as gymnasium) AND there is no possible asbestos material.

2.7 DATA PATCH PANELS

- A. Product Description: TIA/EIA 568, rack-mounted assembly of terminals and accessory patch cords, with adequate capacity for active and spare circuits. 1RU. For all unused positions provide blank module.
- B. Manufacturers:
 1. Panduit Mini-Com 48 Port HD Blank Patch Panel Model CPA48HDBL

a. Provide with each Patch Panel:	
b. Strain Relief Bar	Model SRB19BLY

- 1) Panduit quick release brackets for SRB Model SRBBRKT
2. Belden Modular Patch Panel Empty 48 port 1U Model AX103121
 - a. Belden strain relief bar is included with the patch panel.
3. Ortronics Clarity HDJ 48 Port Patch Panel Model OR-PHAHJU48
 - a. Ortronics strain relief bar is included with the patch panel.

C. Patch panel to be mounted at a minimum of 4 points.

2.8 SPEAKER CABLING

- A. Plenum Cable for Speaker Circuits: 18 AWG copper conductor, shielded, 2 conductor, and covered with a nonmetallic jacket; suitable for use for Class 2 circuits in air handling ducts, hollow spaces used as ducts, and plenums.
1. Belden Part Number 6300FE

2.9 SUBSTITUTIONS

- A. Substitutions Allowed: None
- B. Contractor shall be responsible and assume all costs for removal and replacement of any substituted product installed without prior written approval. Such costs shall include, but not be limited to labor, materials as well as any penalties, fees or costs incurred for late completion.

2.10 SYSTEM DESIGN

- A. Provide a complete permanent end to end system of cabling and pathways for data communications, including but not limited to cables, conduits and wireways, pull wires, support structures, support devices, racks and cabinets, outlets, patch panels, and patch cables.
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. Provide additional outlets where indicated on drawings.
- C. 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.
- D. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.11 GROUNDING AND BONDING COMPONENTS

- A. Comply with TIA-607.
- B. Comply with Section 27 05 26 - Grounding and Bonding For Communications Systems .

2.12 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.
- B. Comply with 27 05 53 - Identification For Communications Systems.

2.13 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - 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. All Networks shall be installed per applicable standards and manufacturer's requirements.
- C. Comply with Communication Service Provider requirements.
- D. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.
- E. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- F. Contractor must remove all abandoned cable per Article 800 of the National Electrical Code and per TIA and BICSI standards, recycling these materials where possible. Removal of orphaned cable is mandatory. Contractors must consider this when placing bids.

3.2 INSTALLATION OF PATHWAYS

- A. Comply with 27 05 28 - Pathways For Communications Systems
- B. Outlet Boxes:
 - 1. Coordinate locations of outlet boxes provided under Section 26 05 33.16 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: 48 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.
 - g. Outlet boxes shall be secured to building with mechanical fasteners. Adhesive fasteners are not allowed.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

- A. Copper Cabling:

1. Use only type CMP plenum-rated cable, do not install below 32°F. If cable is stored below 32°F allow the cable to condition to room temperature 68°F as close to room temperature +/- 10°F 48 hours prior to installation.
 2. Horizontal distribution cables shall be bundled in groups of no more than manufacturers recommendations. Cable bundle quantities in excess of manufacturers recommendations may cause deformation of the bottom cables within the bundle and degrade cable performance.
 3. Maintain cable geometry; do not untwist more than .125 inch from point of termination.
 4. Any cable installed by the contractor exceeding 90 meters (295 feet) long must be replaced and routed to reduce length to 90 meters or less. Complete all cable re-routing at no additional cost to the Owner. Identify in writing to Architect/Engineer prior to installation of any cables that cannot be reduced to 90 meters or less in length.
 5. 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.
 6. Do not pre pull cable out of box / reel prior to installing.
 7. Do not over-cinch or crush cables.
 8. Do not exceed manufacturer's recommended cable pull tension.
 9. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
 10. Protect from paint and other damaging contaminants. (any painted / contaminated cables shall be replaced at contractor's expense).
 11. Leave sufficient slack in the ceiling to reach any telecommunications outlet/connector within room.
 12. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
 13. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits
 14. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.
 15. Install category 6,6A cable in a separate open cable hanger segment. Do not install with coaxial, optical fiber cable or any other cable type.
 16. If cables have more than 12" of sag, install more hangers.
 17. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
 18. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket. Cables with defects shall be replaced.
 19. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. Cabinet / Rack end: 10 feet
 2. Outlet end: 10 feet
 - a. At Distribution Frames: 10 feet.
 - b. At Outlets - Copper: 12 inches.
- C. Copper Cabling:
1. Category 6 and Category 6A: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
 2. Do not exceed 25 pounds pull tension.
 3. Use T568B wiring configuration.
- D. Identification:
1. Use mechanically generated 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 01 40 00 - 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.
- D. Testing per 27 15 55 - Communications Cable Testing
- E. Labeling per 27 05 53 - Identification For Communications Systems
- F. Inspect patch cords for complete labels.
- G. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- H. 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.

3.5 CLOSEOUT ACTIVITIES

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Provide manufacturer warranty documentation, ensure that forms have been completed in Owner's name, and registered with the manufacturer.
- C. Project Record Documents: Record actual locations and sizes of pathways, outlets, and jacks.
 1. Field Test Reports, one hard copy, one PDF copy and one software based copy (ex.: .FLW).

END OF SECTION

SECTION 27 15 55
COMMUNICATIONS CABLE TESTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all labor, materials, tools, equipment, and field-test instruments required for the complete testing, identification and administration of the work called for in the Contract Documents.
- B. To conform to the overall project schedule, the cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.
- C. In addition to the tests detailed in this document, the contractor shall notify the Owner or the Owner's representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.
- D. Minimum requirements for the test certification, identification and administration of backbone and horizontal optical fiber cabling.
 - 1. Category 6/6A Copper Cabling.

1.2 RELATED REQUIREMENTS

- A. Section 27 10 05 - Communications Copper Cabling

1.3 REFERENCE STANDARDS

- A. TIA/EIA-568-C.1 - Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements; Rev C, 2012; Addenda 1-7.
- B. TIA/EIA-568-C.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components; Rev C, 2012; Addenda 1-11.
- C. TIA/EIA-606 - Administration Standard for the Telecommunications Infrastructure; Rev B, 2012.

1.4 SUBMITTALS

- A. Manufacturers catalog sheets and specifications for fiber optic and copper field-test instruments.
- B. Sample test reports.
- C. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

- A. Installer / Tester Qualifications:
 - 1. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BiCSI or the ACP (Association of Cabling Professionals).
 - a. Manufacturer of the copper cable and copper connectors, manufacturer of the fiber optic cable and/or the fiber optic connectors.
 - b. Manufacturer of the test equipment used for the field certification.

B. Testing Equipment Qualifications:

1. Field test instruments shall comply with the accuracy requirements for level III field testers as defined in ANSI/TIA-1152. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table 3 of ANSI/TIA-1152 (Table 3 in this TIA document also specifies the accuracy requirements for the Channel configuration).
2. Field-test instruments shall have the latest software and firmware installed.
3. Field-test instruments (tester) shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
4. The RJ45 test plug shall fall within the values specified in ANSI/TIA-568-C Annex C for NEXT, FEXT and Return Loss.
5. Testing of the fiber cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m in length. The test cords for OTDR testing shall be approximately 100 m for the launch cable and at least 25 m for the receive cable.
6. The copper tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
7. Field-test instruments (tester) shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
8. Field-test instruments shall have the latest software and firmware installed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 COPPER

- A. Every cabling link in the installation shall be tested in accordance with the field test specifications defined in ANSI/TIA-568-C.2 "Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard". This document will be referred to as the "Category 6 Standard."
- B. Every cabling link in the installation shall be tested for the following:
 1. Wire Map
 2. Length
 3. Insertion Loss
 4. NEXT Loss
 5. PS NEXT Loss
 6. ACR-F Loss
 7. PS ACR-F Loss
 8. Return Loss
 9. Propagation Delay
 10. Delay Skew
 11. DC Resistance Unbalance.

- C. The cable type must be set to match the cable manufacturer and type installed, do not set to the default Cat 6 UTP. If the manufacturer of the cable installed is not listed in the field test equipment, only then, the default Cat 6 UTP may be used.
- D. The location of the "Main" shall be at the MDF or IDF and the location of the "Remote" shall be at the outlet. If the location of the "Main" and "Remote" are reversed, it must be noted in the test report documentation for any and all instances.
- E. The installed twisted-pair horizontal links shall be tested from the IDF in the telecommunications room to the telecommunication wall outlet in the work area for compliance with the "Permanent Link" performance specification as defined in the Category 6 Standard.
- F. One hundred percent of the installed cabling links must pass the requirements of the Category 6 Standard and as further detailed in this Section. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with this Section.
- G. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk " * " when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent " * " results shall determine approval or disapproval of the element under test shall be defined in the relevant detail specification, or agreed on as a part of a contractual specification.
- H. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section 4.2.2 of ANSI/TIA-1152). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.

3.2 DOCUMENTATION

- A. The test results / measurements saved within the field test instrument shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of the test records. A guarantee shall be made that the measurement results are transferred to the PC unaltered, i.e., "as saved in the field test instrument" at the end of each test and that these results cannot be modified at a later time. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.
- B. The test results documentation shall be available for inspection by the Owner or the Owner's representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as built information.
- C. The database for the completed job shall be stored and delivered on CD-ROM or DVD prior to Owner acceptance. This CD-ROM or DVD shall include the software tools required to view, inspect, and print any selection of test reports.
- D. Circuit IDs reported by the test instrument should match the specified label ID.
- E. Detailed test result documentation shall be provided in an electronic data base and shall include the following information for each link:
 - 1. Identification of the customer site as specified by the owner.
 - 2. Identification of the link in accordance with the naming convention defined in the overall system documentation.
 - 3. The name of the test limit selected to execute the stored test results.
 - 4. The name of the personnel performing the test.

5. The overall Pass/Fail evaluation of the link-under-test.
 - a. Including the NEXT Headroom (overall worst case) number for copper.
 - b. Including OLTS and OTDR measurements for fiber.
6. Identification of the tester interface.
7. Date and time the test results were saved in the memory of the tester.
8. The manufacturer, model and serial number of the field-test instrument.
9. The version of the test software and the version of the test limit database held within the test instrument
10. Test results information must contain information on each of the required test parameters that are listed in this Section and as further detailed below.

F. Copper

1. Detailed test results data to be provided in the electronic database for must contain the following information:
 - a. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.
 - 1) Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m (1) and the test limit value.
 - 2) Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value.
 - 3) Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value.
 - 4) Insertion Loss (Attenuation): Minimum test results documentation as explained in this Section for the worst pair.
 - 5) Return Loss: Minimum test results documentation as explained in this Section for the worst pair as measured from each end of the link.
 - 6) NEXT, ACR-F: Minimum test results documentation as explained in this Section for the worst pair combination as measured from each end of the link.
 - 7) PS NEXT and PS ACR-F: Minimum test results documentation as explained in this Section for the worst pair as measured from each end of the link.
 - 8) DC Resistance Unbalance.
 - b. Cable type and the value of NVP used for length calculations.

3.3 FIELD QUALITY CONTROL

- A. A representative of the owner shall reserve the right to be invited to witness field testing. The representative shall be notified of the start date of the testing phase five business days before testing commences.
- B. A representative of the owner shall reserve the right to select a random sample of 5% of the installed links. The representative (or his / her authorized delegate) shall test these randomly selected links and the results are to be stored in accordance with the prescriptions in this Section. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the end-user representative shall repeat 100% testing and the cost shall be borne by the installation contractor.

END OF SECTION

SECTION 27 41 00
AUDIO - VIDEO SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Assistive Listening Device

1.2 RELATED REQUIREMENTS

- A. Section 27 05 26 - Grounding and Bonding for Communications Systems.

1.3 REFERENCE STANDARDS

- A. EIA-310 - Cabinets, Racks, Panels, and Associated Equipment; Electronic Industries Association; Revision D, 1992.
- B. CEA-310 - Cabinets, Racks, Panels, and Associated Equipment; Consumer Electronics Association; Revision E, 2005.
- C. TIA/EIA-568-C.1 - Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements; Rev C, 2012; Addenda 1-7.
- D. TIA/EIA-568-C.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components; Rev C, 2012; Addenda 1-11.
- E. TIA/EIA-568-C.3 - Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components Standard, and Addendum 1 - Additional Transmission Performance Specifications for 50/125 um Optical Fiber Cables
- F. TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces; 2012.
- G. TIA-570 - Residential Telecommunications Infrastructure Standard; 2012.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for Audio/Video equipment.
 - 2. Coordinate arrangement of Audio/Video equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with the Construction Management representative.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturers installation instructions.
 - 2. Storage and handling requirements and recommendations.
 - 3. Part numbers.

4. Notes to clarify any part number choices on product sheet.
 5. Installation methods.
 - C. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding.
 - D. Manufacturer Qualifications.
 - E. Installer Qualifications.
 - F. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 30 Days prior to intended test date.
 - G. Field Test Reports.
 - H. 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 contract drawings.
 - I. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.
- 1.6 CLOSEOUT SUBMITTALS
- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
 - B. Project Record Documents: Record actual locations and sizes of pathways and outlets.
- 1.7 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 all work.
 4. Employing experienced technicians for all work; show at least 3 years experience in the installation of the type of system specified, with evidence from at least 2 projects that have been in use for at least 18 months; submit project name, address, and written certification by user.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
 - B. Keep stored products clean and dry.
- 1.9 WARRANTY
- A. See Section 01 78 00 - 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 ASSISTED LISTENING (CAFETERIA LOCATION)

- A. All assisted listening active equipment for the project shall be purchased by the owner and turned over to the electrical contractor for installation. The electrical contractor shall be responsible to provide the services to develop the assisted listening system documentation, equipment installation, wire, wire terminations, back boxes, face plates, conduit, wire-mold, fasteners, common installation material and commissioning such that the project has a complete and workable assisted listening system compliant with section 27 41 00.
- B. Provide Labor, material, equipment, services for a complete installation, startup, and commissioning of the assisted listening wiring as required in contract documents. Provide wiring, conduit, wire terminations, back boxes, wire-mold, fasteners, and common installation material required to connect devices furnished as part of, or integral to the assisted listening system regardless of the source of supply. Provide all wiring and terminations for the assisted listening system in accordance to the specification and detailed engineered drawings provided by factory representative. Provide all assembly and testing of all items as necessary to create a coherent system, encompassing all combined intents of design, drawings, specifications, addenda, and professional quality of work.
- C. Basis of Design: Listen Technologies LP-4VP-072-01

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Comply with all manufacturer's installation instructions for all components being installed.
 - 1. Any installation that does not comply with manufacturer's installation instructions must be approved by engineer prior to installation.

3.2 FIELD QUALITY CONTROL

- A. Comply with inspection and testing requirements of specified installation standards.
- B. 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.

END OF SECTION

SECTION 28 10 00
ACCESS CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Access control system requirements.
- B. Access control units and software.
- C. Access control point peripherals, including readers.
- D. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 08 71 00 - Door Hardware.
 - 1. Includes door hardware with integral request to exit devices.
- C. Section 27 05 26 - Grounding and Bonding For Communications Systems
- D. Section 27 05 53 - Identification For Communications Systems
- E. Section 27 10 05 - Communications Copper Cabling: Data cables for access control system IP network connections.
- F. Section 28 20 00 - Video Surveillance: For interface with access control system.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NEMA - National Electrical Manufacturers Association.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
- G. NFPA 730 - Guide for Premises Security.
- H. NFPA 731 - Standards for the Installation of Electronic Premises Security
- I. UL 294 - Access Control System Units; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other installers to provide suitable door hardware as required for both access control functionality and code compliance.

2. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.
 3. Coordinate the work with other installers to provide power for equipment at required locations.
 4. Coordinate the work with Manufacturer's Representative Services supplier for access control equipment, installation, testing, adjusting, integration, and system start-up.
 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meetings:
1. Conduct meeting with facility representative to review reader and equipment locations.
 2. Conduct meeting with facility representative and other related equipment manufacturers to discuss access control system interface requirements.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.
- D. Design Data: Standby battery/UPS calculations.
- E. Certify that proposed system design and components meet or exceed specified requirements.
- F. Evidence of qualifications for installer.
- G. Evidence of qualifications for maintenance contractor (if different entity from installer).
- H. 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 operation of product.
- I. Manufacturer's detailed field testing procedures.
- J. Field quality control test reports.
- K. Maintenance contracts.
- L. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.
- M. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
 1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.
- N. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- O. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 2. Deliver blank credentials to Owner as directed.

1.6 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70.
 - 2. NFPA 101 (Life Safety Code).
 - 3. The requirements of the local authorities having jurisdiction.
 - 4. Applicable TIA/EIA standards.
- 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. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with access control systems of similar size, type, and complexity and providing contract maintenance service as a regular part of their business; authorized manufacturer's representative.
 - 1. Contract maintenance office located within 100 miles of project site.
- E. Maintenance Contractor Qualifications: Same entity as installer.
- F. 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.
- B. Store products in manufacturer's unopened packaging, keep dry 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 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. The intent of this specification is to lay out the infrastructure requirements for an expansion of the Owner's Access Control System (ACS) and coordinate the installation of the security equipment furnished to the electrical contractor at points indicated on the Drawings.
- B. Provide all structured cabling, terminations, boxes, conduit, penetrations, sleeves, wire-mold, fasteners, and common installation material such that the project has a complete and workable access control system compliant with this Section. Hardware products which do not meet this

design as laid out in Sections 27 05 28 - Pathways For Communications Systems and 27 10 05 - Communications Copper Cabling, shall not be acceptable.

- C. Install all equipment furnished by the Manufacturer's Representative Services supplier referred to in this specification as the Integrator. The electrical contractor shall coordinate with the Integrator the transmittal of equipment, verification of the access control schedule, field installation, and commissioning of the communications cabling system that supports the system.
- D. The electrical contractor shall provide all necessary coordination with the Integrator to produce a fully commissioned Access Control System.

2.2 OWNER-FURNISHED PRODUCTS AND SERVICES

- A. ACS equipment for the project shall be purchased by the Owner via New York State Contract.
 - 1. Identified products shall be installed by the Owner or System Integrator.
 - 2. Remaining products identified as furnished by the Owner shall be turned over to the Electrical Contractor for installation.
 - 3. Refer to the Responsibility Matrix later in this Section for product listing.
- B. The Owner has further entered into a separate contract for Manufacturer's Representative Services.
 - 1. The term Manufacturer's Representative Services supplier shall be synonymous with and interchangeable with the terms Integrator or System Integrator.
 - 2. The Manufacturer's Representative Services supplier for the project is:
 - a. Day Automation Systems, Inc. 7931 Rae Boulevard Rochester, NY 14475
phone: 800-836-0969.
 - 3. Refer to Responsibility Matrix later in this Section for description of services provided.
- C. For a complete listing of Owner-Furnished products including Manufacturer, model, and description, contact the Manufacturer's Representative Services supplier.

2.3 PRODUCTS

- A. Provide such equipment as outlined in the responsibility matrix below, including but not limited to:
 - 1. Patch Cables: As specified in Section 27 10 05 - Communications Copper Cabling.
 - 2. Data Cable Surge Suppression: As specified in Section 27 05 26 - Grounding and Bonding For Communications Systems.
 - 3. Patch Panels: As specified in Section 27 10 05 - Communications Copper Cabling.
- B. Install equipment, identified in the responsibility matrix below, as supplied by the Owner, but not installed by the Owner or Integrator.
- C. Provide wiring, conduit, wire terminations, back boxes, wire-mold, fasteners and common installation material required to connect devices furnished as part of, or integral to the Access Control System regardless of the source of the supply.
 - 1. Provide all wiring and terminations for the Access Control System in accordance with the specifications, contract drawings, and detailed engineered drawings provided by factory representative.
- D. Provide all other devices required for proper complete system operation including, but not limited to, electrical switches, transformers, disconnect switches, sensors, safety devices, power supplies, enclosure, and circuit breakers.
- E. **Reference the responsibility matrix below:**
 - EC - Prime Electrical Contractor
 - Owner - Project Owner
 - Integrator - System Integrator

<u>Products</u>	<u>Furnished By</u>	<u>Installed By</u>	<u>Control Wiring By</u>	<u>Programmed By</u>
Access Control Panels	Owner	EC	EC	Integrator
Access Door Control Modules	Owner	EC	EC	Integrator
Input/Output Boards	Owner	EC	EC	N/A
Proximity Card Readers	Owner	EC	EC	Integrator
Door Contacts	Owner	EC	EC	Integrator
Request To Exit Sensors	Owner	EC	EC	Integrator
Relays	Owner	EC	EC	Integrator
ADA Panels	Owner	EC	EC	Integrator

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive system components.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install access control system in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Wiring Method: Unless otherwise indicated, use cables (not in conduit).
 1. Use suitable listed cables in wet locations, including underground raceways.
 2. Use suitable listed cables for vertical riser applications.
 3. Use listed plenum rated cables in spaces used for environmental air.
 4. Install wiring in conduit for the following:
 - a. Where required for rough-in.
 - b. Where required by authorities having jurisdiction.
 - c. Where exposed to damage.
 - d. Where installed outside the building.
 - e. For exposed connections from outlet boxes to devices.
 5. Conduit: Comply with Section 26 05 33.13.
 6. Conceal all cables unless specifically indicated to be exposed.
 7. Use power transfer hinges complying with Section 08 71 00 for concealed connections to door hardware.
 8. Cables in the following areas may be exposed, unless otherwise indicated:
 - a. Equipment closets.
 - b. Within joists in areas with no ceiling.

9. Route exposed cables parallel or perpendicular to building structural members and surfaces.
 10. Do not exceed manufacturer's recommended maximum cable length between components.
- D. Provide grounding and bonding in accordance with Section 27 05 26.
 - E. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
 - F. Identify system wiring and components in accordance with Section 27 05 53.
 - G. Provide wiring in conduit per NEC and Local codes.
 - H. Provide wiring and connections to door hardware devices.
 - I. Ground and bond security access equipment and circuits in accordance with Section 26 05 26.
 - J. Electronic locking devices shall have a separate power supply. Provide and install power supplies as required to support the locks. The unit shall incorporate integral battery charging capabilities and a fused line voltage input for individual locks. All power supplies shall be equipped with optional battery pack for up to 24 hours of backup. As required, the unit shall be equipped with a module to accommodate fire alarm NC contacts when a fire alarm activates.
 - K. Provide all interface wiring, relays, connections and programming required to interface electric locking/unlocking of door hardware with powered door openers/actuator buttons.
 1. Entry from exterior through door during scheduled lock times: Exterior ADA actuator button/powered opener will be disabled until authorized credentials (card, fob) are presented to Access system reader. Access control system to activate door opener actuator buttons so that when in a locked position, an entry door powered opener will NOT engage against a door with the latch in the locked position. User must first present an authorized credential to the card reader to unlock the door. Authorized credential will unlock door and either initiate opening of door or activate the pushbutton for powered opening activation.
 - a. When entry point has second set of interior Vestibule doors with powered opener, and no actuator button inside the Vestibule, the interior opened door must have programmed time delay to stay open for a sufficient time to allow the persons to pass through.
 2. Exit at powered door in scheduled lock times: Upon pushing interior located actuator button(s), the access control system will unlock associated doors and allow the person to pass through door(s) and exit the building. Doors to close and lock after (adjustable) set time period.
 - L. At locations with removable mullions and electric strikes, provide quick disconnect plugs in order to facilitate the removal of the mullion without cutting the wires to the electric strike.
 - M. All conduit sleeves and holes shall be ground smooth to remove all sharp edges and burrs that could potentially damage cabling. All cabling shall be supported and protected at all holes, penetration points, boxes, conduit, etc. with protective grommets or material that will protect the cabling from any abrasive contact with surfaces that might cause damage.
 - N. Comply with manufacturer's instructions and recommendations for installation of product in the applications indicated. Anchor products securely in place, accurately located and aligned with other work.
 - O. It is the installer's / contractor's responsibility to test every aspect of the ACS system and document the location and performance of every cable, termination point, riser, control panel, Card Reader, Door contact, rex, Input point, and all associated software functions.
 - P. All cable management (troughs) are mounted tight, level and square with all fasteners installed and be free of debris on the inside and outside.

- Q. All cabling outside enclosures are installed free from sharp edges and dressed neatly.
- R. Cables installed using approved method when not in cable management trays.
- S. Cable management not to use adhesive tie wraps, due to loss of secure mounting.
- T. Cables enter and leave junction boxes using proper bushings, fittings, grommets.
- U. All wiring to be neatly dressed. All Bend radii are sufficient, and equate to cable type requirements.
- V. Cable runs are continuous and not spliced. Field splice connections will be documented and only as necessary to end of line device to minimize points of failure/DB loss. Field splice connections will be in secured enclosure.
- W. All terminations at field devices are visually inspected to ensure properly soldered-no dolphins, wire nuts or b-connects.
- X. All field devices mounted using approved installation fasteners and hardware to ensure serviceability (field devices can be removed and remounted)
- Y. All field devices mounted tight, level, square and sealed as needed for weatherproof applications.
- Z. All terminations at field devices are inspected to ensure there are no bare wire conductors and all is insulated and shrink wrapped. All spare un-terminated conductors are properly safe-ended with shrink wrap.
- AA. Supervision EOL resistors are located at the field device to be supervised.
- AB. Cable installation shall not impact any existing cabling infrastructure.

3.3 SYSTEM PROGRAMMING

- A. The Contractor and the ACS Vendor are jointly responsible for Initial Programming and report formatting of the ACS as specified herein and as directed by the owner/owner representative. The owner will convey their programmable operational requirements for all system functions in lay terms, and Initial System programming will be completed to satisfy the owner's requirements.
- B. The Contractor and the ACS Vendor will be required to meet with the owner's representatives a Min. 3 times to discuss, recommend and document the owner's needs for programming and sequences of operation.
- C. Programming Functions to be provided shall include but not be limited to:
 - 1. Schedules, groups and sequence of operation(s) for:
 - a. Access Groups
 - b. Access Levels
 - c. Actions
 - d. Action Groups
 - e. Alarm Inputs
 - f. Alarm Mask Groups
 - g. Alarm Outputs
 - h. Areas
 - i. Badge Types
 - j. Badge creation
 - k. Card Formats
 - l. Cardholders
 - m. Card Readers
 - n. Global I/O Function Lists

- o. Global I/O Links
 - p. Holidays
 - q. Maps
 - r. Monitor Zones
 - s. Receiver Accounts
 - t. System Operators
 - u. User Permission Groups
 - v. Time Zones
 - w. Visitor management
- 2. Initial Graphic Map creation with icons and programming setup
 - 3. Set-up and pathing of all alarm notifications
 - 4. Report generation and formats for printing and notifications.
 - 5. Door Monitoring Status: Alarm Conditions; Graphic Annunciation

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
- C. Prepare and start system in accordance with manufacturer's instructions.
- D. Program system parameters according to requirements of Owner.
- E. Test for proper interface with other systems.
- F. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
- G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.5 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.6 DEMONSTRATION AND MANUALS

- A. Manuals: Final copies of the manuals shall be delivered after completing the installation test with signed (owner/owner representative) proof of receipt. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of the contractor responsible for the installation and maintenance of the system and the factory representatives for each item of equipment for each system. The manuals shall have a table of contents and labeled sections. The final copies delivered after completion of the installation test shall include all modifications made during installation, checkout, and acceptance testing. The manuals shall consist of the following:
 - B. Functional Design Manual: The functional design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included.
 - C. Hardware Manual: The manual shall describe all equipment furnished including:
 - 1. General description and specifications
 - 2. Installation and check out procedures
 - 3. Equipment layout and electrical schematics to the component level
 - 4. System layout drawings and schematics

5. Alignment and calibration procedures
 6. Manufacturers repair parts list indicating sources of supply
- D. Software Manual: The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
1. Definition of terms and functions
 2. System use and application software
 3. Initialization, start up, and shut down
 4. Reports generation
 5. Details on forms customization and field parameters
 6. Operators Manual: The operators manual shall fully explain all procedures and instructions for the operation of the system including:
 7. Computers and peripherals
 8. System start up and shut down procedures
 9. Use of system, command, and applications software
 10. Recovery and restart procedures
 11. Graphic alarm presentation
 12. Use of report generator and generation of reports
 13. Data entry
 14. Operator commands
 15. Alarm messages and reprinting formats
 16. System permissions functions and requirements
- E. Maintenance Manual: The maintenance manual shall include descriptions of maintenance for all equipment including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.
- F. As-Built Drawings: During system installation, the Contractor shall maintain a separate hard copy set of drawings, elementary diagrams, and wiring diagrams of the ACS to be used for record drawings. This set shall be accurately kept up to date by the Contractor with all changes and additions to the ACS. Copies of the final as-built drawings shall be provided to the end user in DXF format.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
- C. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. Provide minimum of four hours of training.
 3. Instructor: Manufacturer's authorized representative.
 4. Location: At project site.

3.8 PROTECTION

- A. Protect installed system components from subsequent construction operations.

3.9 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

- B. Provide to Owner, a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of access control system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

END OF SECTION

SECTION 28 20 00
VIDEO SURVEILLANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Video surveillance system requirements.
- B. Video recording and viewing equipment.
- C. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 27 05 26 - Grounding and Bonding For Communications Systems.
- C. Section 27 05 28 - Pathways For Communications Systems
- D. Section 27 05 53 - Identification For Communications Systems.
- E. Section 27 10 05 - Communications Copper Cabling: Data cables for IP video surveillance system network connections.
- F. Section 27 15 55 - Communications Cable Testing.
- G. Section 28 10 00 - Access Control.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 303 - Standard for Installing Closed-Circuit Television (CCTV) Systems; 2005.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 730 - Guide for Premises Security
- E. NFPA 731 - Standards for the Installation of Electronic Premises Security Systems
- F. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of cameras with structural members, ductwork, piping, equipment, luminaires, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
 - 2. Coordinate the work with Manufacturer's Representative Services supplier for cameras and equipment, installation, testing, adjusting, integration, and system start-up.
 - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meetings:

1. Conduct meeting with facility representative to review camera and equipment locations and camera field of view objectives.
2. Conduct meeting with facility representative and other related equipment manufacturers to discuss video surveillance system interface requirements.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
- C. Evidence of qualifications for installer.
- D. Field quality control test reports.
- E. Project Record Documents: Record actual locations of cameras and routing of cables.
- F. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
 1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.

1.6 QUALITY ASSURANCE

- A. Comply with the following:
 1. NFPA 70.
 2. Applicable TIA/EIA standards.
- 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 and with service facilities within 100 miles of project.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with video surveillance systems of similar size, type, and complexity.
- E. 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 and NECA 303.
- B. Store products in manufacturer's packaging, keep dry 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 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. The intent of this specification is to lay out the infrastructure requirements for an expansion of the Owner's Digital Video Management System (DVMS) and coordinate the installation of the security equipment furnished to the electrical contractor at points indicated on the Drawings.
- B. Provide all structured cabling, terminations, boxes, conduit, penetrations, sleeves, wire-mold, fasteners, and common installation material such that the project has a complete and workable video surveillance system compliant with this Section. Hardware products which do not meet this design as laid out in Sections 27 05 28 - Pathways For Communications Systems and 27 10 05 - Communications Copper Cabling, shall not be acceptable.
- C. Install all equipment furnished by the Manufacturer's Representative Services supplier referred to in this specification as the Integrator. The electrical contractor shall coordinate with the Integrator the transmittal of equipment, verification of the camera schedule, field installation, final aiming and commissioning of the communications cabling system that supports the system.
- D. The electrical contractor shall provide all necessary coordination with the Integrator to produce a fully commissioned DVMS & IP Security Camera system.

2.2 OWNER-FURNISHED PRODUCTS AND SERVICES

- A. DVMS equipment for the project shall be purchased by the Owner via New York State Contract.
 - 1. Identified products shall be installed by the Owner or System Integrator.
 - 2. Remaining products identified as furnished by the Owner shall be turned over to the Electrical Contractor for installation.
 - 3. Refer to the Responsibility Matrix later in this Section for product listing.
- B. The Owner has further entered into a separate contract for Manufacturer's Representative Services.
 - 1. The term Manufacturer's Representative Services supplier shall be synonymous with and interchangeable with the terms Integrator or System Integrator.
 - 2. The Manufacturer's Representative Services supplier for the project is:
 - a. Day Automation Systems, Inc. 7931 Rae Boulevard Rochester, NY 14475
phone: 800-836-0969.
 - 3. Refer to Responsibility Matrix later in this Section for description of services provided.
- C. For a complete listing of Owner-Furnished products including Manufacturer, model, and description, contact the Manufacturer's Representative Services supplier.

2.3 PRODUCTS

- A. Provide such equipment as outlined in the responsibility matrix below, including but not limited to:
 - 1. Patch Cables: As specified in Section 27 10 05 - Communications Copper Cabling.

- 2. Data Cable Surge Suppression: As specified in Section 27 05 26 - Grounding and Bonding For Communications Systems.
 - 3. Patch Panels: As specified in Section 27 10 05 - Communications Copper Cabling.
- B. Install equipment, identified in the responsibility matrix below, as supplied by the Owner, but not installed by the Owner or Integrator.
- C. Provide wiring, conduit, wire terminations, back boxes, wire-mold, fasteners and common installation material required to connect devices furnished as part of, or integral to the DVMS system regardless of the source of the supply.
- 1. Provide all wiring and terminations for the DVMS system in accordance with the specifications, contract drawings, and detailed engineered drawings provided by factory representative.
- D. Provide all other devices required for proper complete system operation including, but not limited to, electrical switches, transformers, disconnect switches, sensors, safety devices, power supplies, enclosure, and circuit breakers.
- E. **Reference the responsibility matrix below:**
EC - Prime Electrical Contractor
Owner - Project Owner
Integrator - System Integrator

<u>PRODUCTS</u>	<u>FURNISHED BY</u>	<u>INSTALLED BY</u>	<u>SIGNAL WIRING BY</u>	<u>PROGRAMMED BY</u>
NETWORK VIDEO RECORDER	OWNER	OWNER / INTEGRATOR	EC	INTEGRATOR
CAMERAS & MOUNTS	OWNER	EC	EC	INTEGRATOR
CAMERA SOFTWARE LICENSE	OWNER	INTEGRATOR	N/A	INTEGRATOR
PATCH CABLES	EC	EC	EC	N/A
DATA CABLE SURGE SUPPRESSION	EC	EC	EC	N/A
PATCH PANELS	EC	EC	EC	N/A
UPS	OWNER	OWNER / INTEGRATOR	EC	INTEGRATOR
NETWORK SWITCHES	OWNER	OWNER / INTEGRATOR	EC	INTEGRATOR
ENCODERS	OWNER	OWNER / INTEGRATOR	EC	INTEGRATOR

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.

- B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive system components.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install video surveillance system in accordance with NECA 1 (general workmanship) and NECA 303.
- B. Comply with the provisions of NFPA 70.
- C. Comply with manufacturer's instructions and recommendations for installation of product in the applications indicated. Anchor products securely in place, accurately located and aligned with other work.
- D. Provide required support and attachment in accordance with Section 26 05 29.
- E. Wiring Method: Unless otherwise indicated, use cables (not in conduit).
 - 1. Use listed plenum rated cables in all spaces.
 - 2. Conduit: Comply with Section 26 05 33.13.
 - 3. Conceal all cables unless specifically indicated to be exposed.
 - 4. Cables in the following areas may be exposed, unless otherwise indicated:
 - a. Equipment closets.
 - b. Within joists in areas with no ceiling.
 - 5. Route exposed cables parallel or perpendicular to building structural members and surfaces.
 - 6. Include service loop cable lengths to allow relocation of cameras within 10 ft of installed location.
- F. Provide grounding and bonding in accordance with Section 27 05 26.
- G. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- H. Identify system wiring and components in accordance with Section 27 05 53.
- I. Label all cameras per Owner requirements and to match as in software naming convention.
- J. For IP Cameras: Test all cabling per Section 27 15 55.
- K. The Contractor shall carefully follow instructions in documentation provided by the manufacturers to insure all steps have been taken to provide a reliable system.
- L. Coordinate with the Manufacturer's Representative Services supplier to ensure the following:
 - 1. All cameras are verified for start up and software programming.
 - 2. All equipment has been tested and configured in accordance with instructions provided by the manufacturer prior to installation.
- M. Coordinate all final locations with owner. Get sign off from owner on final view of camera.

3.3 DVMS - GROUNDING

- A. The Grounding wires connected from the Surge devices and earth ground to be grounded according to NEC and NFPA related codes. Grounding to common electrical building ground to be verified prior to install via measurement of resistance to ground in grounding system

connection points. Grounding shall eliminate potential equipment damage from possible ground loops created by multiple ground rods. It shall allow the electrical potential of the entire facility to rise and fall in a uniform manner, reducing the possibility of excessive current flow on the grounding system.

- B. Whenever possible, the conductor length to earth ground should be less than the conductor length from the surge suppression device to the protected equipment.
- C. When connecting a parallel surge suppression device to a building ground system, the leads from the surge suppression device should be as short and straight as possible.
- D. The ground system should have a maximum resistance of 25 ohms. 5 ohms, or less, is the preferred level for optimum performance of the surge suppression device.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Interface installation of video surveillance with security access and intrusion detection systems.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Coordinate with the Manufacturer's Representative Services supplier for the following:
 - 1. Perform inspection and testing.
 - 2. Prepare and start system in accordance with manufacturer's instructions.
 - 3. Adjust cameras to provide desired field of view and produce suitable images under all service lighting conditions.
 - 4. Program system parameters according to requirements of Owner.
 - 5. Test for proper interface with other systems.
- C. Each shall correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
- D. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.6 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Coordinate with the Manufacturer's Representative Services supplier for the following:
 - 1. Demonstration: Demonstrate proper operation of system to Owner.
 - a. Provide personnel to correct deficiencies or make adjustments as directed.
- C. The Contractor and Manufacturer's Representative Services supplier shall each provide a Hardware Manual as it relates to the products supplied under their scope of work.
 - 1. The manual shall describe all equipment furnished including:
 - a. General description and specifications.
 - b. Installation and check out procedures.
 - c. Equipment layout and electrical schematics to the component level.
 - d. System layout drawings and schematics.
 - e. Alignment and calibration procedures.
 - f. Manufacturers' repair parts list indicating sources of supply.
- D. As-Built Drawings: During system installation, the Contractor shall maintain a separate hard copy set of drawings, elementary diagrams, and wiring diagrams of the DVMS to be used for

record drawings. This set shall be accurately kept up to date by the Contractor with all changes and additions to the DVMS. Copies of the final as-built drawings shall be provided to the end user in PDF format.

3.8 PROTECTION

- A. Protect installed system components from subsequent construction operations.

END OF SECTION

SECTION 28 46 21.16
EXISTING FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Extension of existing Addressable Fire Detection and Alarm system components, wiring, and conduit indicated, in full compliance with National and Local Codes.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping: Materials and methods for work to be performed by this installer.
- B. Section 26 05 53 - Identification for Electrical Systems; Marking Fire Alarm components and raceways.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- D. FM (AG) - FM Approval Guide; current edition.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.
- I. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- J. UL (ECMD) - Electrical Construction Materials Directory; current edition.
- K. UL (FPED) - Fire Protection Equipment Directory; current edition.
- L. UL 1480 - Standard for Speakers for Fire Alarm and Signaling Systems, Including Accessories; Current Edition, Including All Revisions.
- M. UL 1971 - Standard for Signaling Devices for the Hearing Impaired; Current Edition, Including All Revisions.
- N. UL 2075 - Standard for Gas and Vapor Detectors and Sensors; Current Edition, Including All Revisions.
- O. UL 268 - Standard for Smoke Detectors for Fire Alarm Systems; Current Edition, Including All Revisions.

- P. UL 268A - Standard for Smoke Detectors for Duct Application; Current Edition, Including All Revisions.
- Q. UL 38 - Standard for Manual Signaling Boxes for Fire Alarm Systems; Current Edition, Including All Revisions.
- R. UL 464 - Standard for Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories; Current Edition, Including All Revisions.
- S. UL 521 - Standard for Heat Detectors for Fire Protective Signaling Systems; Current Edition, Including All Revisions.
- T. UL 864 - Control Units and Accessories for Fire Alarm Systems; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Schedule and convene one week prior to beginning the work of this Section. Include all trades affected by the work of this Section.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories. Complete manufacturer's catalog data including supervisory power usage, alarm power usage, physical dimensions, and finish and mounting requirements.
- C. Power calculations. Battery capacity calculations. Battery size shall be a minimum of 125% of the calculated requirement. Provide the following supporting information:
 - 1. Supervisory power requirements for all equipment.
 - 2. Alarm power requirements for all equipment.
 - 3. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity.
 - 4. Voltage drop calculations for wiring runs demonstrating worst-case condition.
 - 5. NAC circuit design shall incorporate a 15% spare capacity for future expansion.
- D. The installation contractor shall submit for approval prior to installation of wire, a proposed color code for system conductors to allow rapid identification of circuit types.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Qualification Data: For qualified Installer, Applicator, manufacturer, fabricator, professional engineer, testing agency, and factory-authorized service representative.
- H. Source quality-control reports.
- I. Field quality-control reports.
- J. Operation and Maintenance Data: For all fire alarm equipment, to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Field Service:

1. Engage a factory-authorized service representative from owner's existing fire alarm maintenance provider to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
 2. Prior to bid, the Electrical Contractor shall coordinate with the factory-authorized service representative to evaluate the existing system, and identify additional components required to support a fully functioning system, including spare capacities as outlined in this specification. All required devices, associated equipment and programming shall be included in the Electrical Contractor's bid, including, but not limited to:
 - a. Additional NAC power supplies required to support all new devices.
 - b. Battery calculations including additional batteries as needed for new devices.
 - c. Any additional initiating device hardware installed in the existing panel that is required for new devices.
 - d. An additional "sub-panel" to the FACP if needed and as determined by the factory-authorized service representative.
 - e. Software updates and required programming of the existing panel to accept all new devices.
 - f. Additional remote annunciator(s) as indicated on the drawings.
 - g. Coordination with kitchen hood fire suppression system installer, including any additional relays or hardware required.
 - h. Coordination with elevator installer and any required connections, hardware or programming as it relates to elevator recall.
- B. Installer Qualifications:
1. Firm with a minimum three years documented experience installing fire alarm systems of the same scope, type and design as specified.
 2. The contractor shall submit copies of all required Licenses and Bonds as required in the State of New York.
 3. The contractor shall employ on staff a minimum of one NICET level II technician or a professional engineer, registered in the State of New York.
 4. The contractor shall be qualified by UL for certifying fire alarm systems.
 5. Contractors unable to comply with the provisions of Qualification of Installers shall present proof of engaging the services of a subcontractor qualified to furnish the required services.
- C. Source Limitations: In the interest of job coordination and responsibilities the installing contractor shall contract with a single supplier for fire alarm equipment, engineering, programming, inspection and tests, and shall be capable of providing a "UL Listing Certificate" for the complete system.
- D. Testing Agency Qualifications: Qualified for testing indicated.
- E. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 50 or less.
 3. Combustion Characteristics: ASTM E136.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Comply with all applicable Codes as they relate to the products, installation, testing and operation of the complete system.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, and shelf life if applicable.
- B. Store materials inside, under cover, above ground, and kept dry and protected from physical damage until ready for use. Remove from site and discard wet or damaged materials.

1.8 PROJECT CONDITIONS

- A. Installed products or materials shall be free from any damage including, but not limited to, physical insult, dirt and debris, moisture, and mold damage.
- B. Environmental Limitations: Do not deliver or install products or materials until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire alarm equipment that fail(s) in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 1 year from date of Substantial Completion.

1.10 SERVICE AGREEMENT

- A. Technical Support: Beginning with Substantial Completion, provide software support for one year.
- B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. At the Pocantico Hills Central School District campus, the existing GE EST 3 control panel(s) shall be modified to allow new devices to be added. New devices are to be added in areas of renovation only, as indicated on the drawings.
- B. The system shall include all required hardware, raceways, interconnecting wiring and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein.
- C. The system as specified shall be supplied, installed, tested and approved by the local Authority Having Jurisdiction, and turned over to the owner in an operational condition.
- D. All equipment furnished shall be new and the latest state of the art products of the existing installed manufacturer.

2.2 SYSTEM COMPONENTS

- A. Batteries
 - 1. Fire Alarm System: Batteries shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of 24 hours with (12) hours of alarm signal at the end this 24-hour period, as required by NFPA 72, Local Systems.
 - 2. Carbon Monoxide Detection System: Batteries shall be dedicated to the Carbon Monoxide Detection System as required by NFPA 72, Secondary Power Supply.
- B. Notification Appliance Circuits (NACs):
 - 1. Two Independent Notification Appliance Circuits: Provided on basic module, polarized and rated at 1.5 amperes DC per circuit, individually overcurrent protected and supervised for opens, grounds, and short circuits.
 - a. Shall be capable of being wired Class B, Style Y.
 - b. With installation of optional Class A Option Module (CAOM), Shall be capable of being wired Class A, Style Z.
 - 2. Power Output: Shall be regulated so that UL Listed notification appliances with an operating voltage range of 17-26 VDC may be installed on the circuits.
 - a. Voltage: 24 VDC regulated.
 - b. Current: 1.5 amps, maximum alarm.
 - 3. Notification appliance circuits to provide synchronization of all strobe lights at a rate of 1Hz and shall operate the horns with a march time cadence signal. The circuit shall provide the capability to silence the audible signals, while maintaining the visual strobe signals. Notification circuits shall consist of a single pair of wires for each circuit. The ability to synchronize multiple notification circuits shall be provided.
 - 4. Provide additional NACs, as required, to supply power to all new devices that are being added to the existing system, and to maintain a 15% spare capacity for future expansion.
 - 5. Provide updated graphic display indicating new and renovated areas with room numbers as they physically appear at each space:
 - a. UV fade-resistant inks with unlimited color selection.
 - b. Heavy-duty aluminum anodized frame.
 - c. Security mounting hardware.
 - d. Polycarbonate clear protective window.
 - e. Approximately 24" x 18".
- C. Emergency Voice/Alarm Communication Systems and Mass Notification Systems.
 - 1. Provide products that are listed and labeled as complying with UL 864.
 - 2. Add-on voice message capable unit to non-voice FACP.
 - 3. Capable of producing the following selectable options:
 - a. Multiple pre-audio tones.
 - b. Multiple pre-recorded audio messages or custom user recorded message.
 - c. Multiple post-audio tones.
 - 4. Strobe circuit activation.
 - 5. Internal push-to-talk microphone for operator control.
 - 6. Power: 120 VAC with cabinet mounted 12 Ah batteries.
 - 7. Class D amplifier providing 40W @ 25 or 70.7 VRMS.

2.3 INTELLIGENT INITIATING DEVICES

- A. General
 - 1. All initiation devices shall be insensitive to initiating loop polarity. Specifically, the devices shall be insensitive to plus/minus voltage connections.
- B. Smoke Detectors – Standard Addressable
 - 1. Provide products that are listed and labeled as complying with UL 268.

2. The detector shall have a multicolor LED to streamline system maintenance/inspection by plainly indicating detector status as follows: green for normal operation, amber for maintenance required, red for alarm.
 3. The multi-criteria smoke detector shall be an intelligent digital photoelectric detector with a programmable heat detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. So as to minimize the effort required by the installing and maintenance technician to appropriately configure the detector to ensure optimal system design, the detectors shall be programmable as application specific. Application settings shall be selected in software for a minimum of eleven environmental fire profiles unique to the devices installed location.
 4. The detector shall be designed to eliminate the possibility of false indications caused by dust, moisture, RF/EMI, chemical fumes and air movement while factoring in conditions of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm condition report.
 - a. The detector shall be guaranteed in writing not to false alarm when configured by the factory trained certified technician. The detector must provide up to 11 different environmental algorithms that allow the detector to provide superior false alarm immunity without the need for additional alarm verification delays.
 5. The intelligent smoke detector shall be capable of providing three distinct outputs from the control panel. The outputs shall be from an input of smoke obscuration, a thermal condition or a combination of obscuration and thermal conditions. The detector shall be designed to eliminate calibration errors associated with field cleaning of the chamber.
 6. The detector shall support the use of a relay, or LED remote indicator without requiring an additional software address. Low profile, white case shall not exceed 2.5 inches of extension below the finish ceiling.
 7. For the detector where required, there shall be available a locking kit and detector guard to prevent unauthorized detector removal.
 8. Where required, there shall be available a programmable remote lamp configurable to remotely duplicate the on-board LED status of another system device with the same software address.
- C. Heat Detectors – Addressable
1. Provide products that are listed and labeled as complying with UL 521.
 2. The detectors furnished shall have a listed spacing for coverage up to 2,500 square feet and shall be installed according to the requirements of NFPA 72 for open area coverage.
 3. Heat detector shall have the following temperature settings:
 - a. Fixed temperature at 135°F, 195°F.
 - b. Rate of Rise at 15°F/ min (8.3°C) at 135°F (57°C)
- D. Duct Smoke Detectors – Addressable
1. Provide products that are listed and labeled as complying with UL 268.
 2. For duct detector applications, the smoke detector shall be an intelligent digital photoelectric detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes.
 3. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. The detector shall be mounted in a duct detector housing listed for that purpose. The duct detector shall support the use of a remote test switch, relay or LED remote indicator. The duct detector shall be supplied with the appropriate sampling tubes to fit the installation.
 4. Where duct detectors are exposed to the weather a weatherproof enclosure shall be available. The duct housing cover shall include a test port for functional testing of the detector without cover removal. The duct housing shall include a cover removal switch capable of indicating cover removal status to the fire alarm control panel.

5. Where required there shall be available a duct housing with an on-board relay. Also where required, there shall be a standalone housing available with its own power supply and test/reset switch that does not require connection to a fire alarm control panel.
 6. Duct smoke detector housing shall allow use in duct systems with air velocity ranging from 100 to 4,000 feet per minute, within temperature ranges of 32°F to 120°F per minute, and with relative humidity ranging from 0 to 95%.
 7. Duct Housings and Accessories:
 - a. Global Air Duct Housing for Conventional and Addressable Detectors
 - b. Global Air Duct Housing for Addressable P2 Detectors with Relay Application
 - c. Global Air Duct Housing for Conventional Detectors with Relay Application
 - d. Global Air Duct Housing for Conventional Detectors with Relay Application and Built-in Power Source
 - e. Weather-Proof housing to accommodate all versions of Global Air Duct Housings
 - f. Remote Test Lamp for Conventional Detectors
- E. Detector Bases – Addressable
1. Provide products that are listed and labeled as complying with UL 2075.
 2. Detector bases shall be low profile twist lock type with screw clamp terminals and self-wiping contacts. Bases shall be installed on an industry standard, 4" square or octagonal electrical outlet box.
 3. Detectors shall be listed per UL 268A as "direct in duct" without need for a duct housing.
 4. Multi-Criteria Fire Detector shall be listed as providing CO detection in duct application.
 5. Provide 6" Base.
 6. Provide 4" Base.
- F. Manual Pull Stations – Addressable
1. Provide products that are listed and labeled as complying with UL 38.
 2. Provide Double action pull stations, unless otherwise indicated to be:
 - a. Break Glass.
 - b. Explosion Proof.
 - c. Weatherproof.
 - d. Reset key options.
 - e. Metal housing.
 3. Intelligence for reporting address, identity, alarm and trouble to the fire alarm control panel.
 4. Communications shall allow the station to provide alarm input to the system and alarm output from the system within less than four (4) seconds.
 5. Connection: Terminal strip and pressure style screw terminals for field wiring.
 6. Mounting: Flush or surface mount, as required.
 - a. Surface mount: Provide matching red enamel outlet box.
 7. Location: As indicated on drawings.
- G. Addressable Interface Devices
1. Provide products that are listed and labeled as complying with UL 864.
 2. Addressable Interface Devices shall be provided to monitor contacts for such items as water-flow, tamper, and PIV switches connected to the fire alarm system. These interface devices shall be able to monitor a single or dual contacts. An address will be provided for each contact. Where remote supervised relay is required the interface shall be equipped with a SPDT relay rated for 4 amps resistive and 3.5 amps inductive.
 3. Where needed a Conventional Zone Module shall connect to the Signal Line Circuit, which will allow the use of conventional initiation devices. This module shall have the ability to support up to 15 conventional smoke detectors and an unlimited number of contact devices. This module shall also be capable of monitoring Linear Beam detectors and conventional Flame detectors. Where required, there shall be an intrinsically safe detection solution for NEMA defined intrinsically safe installations compatible with the conventional zone module.

4. Single Device Damper Monitoring and Control: A single switch input shall be able to monitor all 3 states of a damper – open, closed, and in transit. A single device shall be able to fully control a damper (through the relay connected to the motor control) while also using its switch input for monitoring all 3 states of the damper.
5. Addressable input/output module shall be insensitive to polarity and shall have capability for up to 4 separate inputs (Class B) or 2 separate Class A inputs and 4 separate outputs (Class B).

2.4 DEVICE PROGRAMMING UNIT

- A. Device Programming Unit: The programming tool shall program the intelligent devices with addresses. The unit shall test the device to respond to its address. Dip switches and rotary switches shall not be acceptable. The programmer shall have a carrying case.

2.5 NOTIFICATION APPLIANCES

A. General

1. All notification appliances shall be listed for “Special Applications”
2. All notification appliances shall be backward compatible.
3. All inputs shall be compatible with standard, reverse polarity supervision of circuit wiring by a Fire-Alarm Control Panel (FACP).

B. Strobes

1. Provide products that are listed and labeled as complying with UL 1971 for Indoor Fire Protection Service, and meeting the requirements of FCC Part 15, Class B.
2. Strobe appliances shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range, and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens.
3. The Strobe shall be of low-current design.
4. The strobe intensity shall have field-selectable settings, and shall be rated per UL 1971 for 15/30/75/95cd or 115/177cd for ceiling mount where Multi-Candela appliances are specified.
5. The selector switch for selecting the candela shall be tamper resistant.
6. The appliance shall be compatible with sync modules or strobe power panel supply with built-in sync protocol when synchronization is required.
7. The strobes shall not drift out of synchronization at any time during operation.
8. If the sync module or Power Supply fails to operate, (i.e. - contacts remain closed), the strobe shall revert to a non-synchronized flash rate.
9. The strobes shall be designed for indoor surface of flush mounting
10. The Strobe Appliances shall incorporate a Patented, Integral Strobe Mounting Plate that shall allow mounting to single-gang, double-gang, 4-inch square, 100mm European type back boxes, or the surface back box.
11. The Multi-Candela or Single-Candela Strobe Plate shall mount to either a standard, 4-inch square back box for flush mounting, or shall mount to a box for surface mounting.

C. AC Horn

1. Provide products that are listed and labeled as complying with UL 464.
2. Material: Die-cast metal housing to protect the horn mechanism.
 - a. Finish: Textured enamel.
3. Sound output: 95 dBA minimum at 10 feet.
4. Mounting options shall include surface mounting for indoor or outdoor applications and semi-flush for indoor applications
5. All models shall have screw terminal inputs for in / out field wiring.

D. Mini Horn Appliances

1. Provide products that are listed and labeled as complying with UL 464.
2. Notification appliance shall be electronic, and shall have field-selectable settings for Temporal (Code 3) or continuous horn and support coded-systems operation.

3. The anechoic sound pressure measurement on Temporal (Code 3) and Continuous Horn settings shall each be 87 dBA minimum at 24VDC.
 4. IN / OUT wiring using terminals that accept #12 to #18 AWG wiring.
 5. The appliances shall be mounted indoors, and mount on standard, single-gang electrical back boxes requiring no additional trim plates or adapters
- E. Horn and Horn Strobe Appliances
1. Provide products that are listed and labeled as complying with UL 1971, UL 464, and meeting the requirements of FCC Part 15, Class B.
 2. Horn Strobe and standalone Horn Appliances shall have a minimum of three (3) field selectable setting for dBA levels, and shall have a choice of continuous or temporal (Code 3) audible outputs.
 3. Devices shall be of low-current design.
 4. Strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Input Voltage Range, and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens.
 5. Strobe intensity, where Multi-Candela appliances are specified, shall have field-selectable settings, and shall be rated per UL 1971 for:
 - a. 15/30/75/110cd.
 - b. 135/185cd.
 6. The selector switch for selecting the candela setting shall be tamper resistant.
 7. The appliance, when synchronization is required, shall be compatible with sync modules or Power Supplies with built-in Sync Protocol.
 8. The strobes shall not drift out of synchronization at any time during operation.
 9. The strobes shall revert to a non-synchronized flash-rate, if the sync module or Power Supply should fail to operate (i.e. – contacts remain closed).
 10. All candela ratings represent minimum-effective Strobe intensity, based on UL 1971.
- F. Speaker Strobe Appliances
1. Speaker Strobe Appliances shall meet and be listed for UL 1480.
 2. Speaker shall operate on a standard 25VRMS or 70.7VRMS NAC using twisted / shielded wire.
 3. Speaker shall have the following taps: 0.25W, 0.50W, 1.0W and 2.0W.
 4. The speaker frequency shall be 400Hz to 4000Hz for fire alarm, and 125Hz to 12kHz for general signaling.
 5. The speaker shall install directly to a 4 inch square, 1-1/2 inch deep box with 1-1/2 inch extension.
 6. Strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Input Voltage Range, and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens.
 7. Strobe intensity, where Multi-Candela appliances are specified, shall have field-selectable settings, and shall be rated per UL 1971 for:
 - a. 15/30/75/110cd
 - b. 135/185cd
 8. The selector switch for selecting the candela setting shall be tamper resistant.
 9. The appliance, when synchronization is required, shall be compatible with sync modules or Power Supplies with built-in Sync Protocol.
 10. The strobes shall not drift out of synchronization at any time during operation.
 11. The strobes shall revert to a non-synchronized flash-rate, if the sync module or Power Supply should fail to operate (i.e. – contacts remain closed).
 12. All notification appliances shall listed for Special Applications:
 - a. Strobes are designed to flash at 1-flash-per-second minimum over their “Regulated Input Voltage Range”.
 13. All candela ratings represent minimum-effective Strobe intensity, based on UL 1971.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Perform work in accordance with the requirements of NFPA 70, NFPA 72 and NECA 1 - Standard of Good Workmanship in Electrical Contracting.
- B. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.
- C. In the event that limited energy cable installation is allowed, all cable runs shall be run at right angles to building walls, supported from structure at intervals not exceeding 3 feet and where installed in environmental air plenums, be rated for such use and tied/supported by components listed for environmental air plenums installation.
- D. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
- E. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- F. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- G. Provide primary power for each panel from normal/ emergency panels as indicated on the Electrical Power Plans. Power shall be 120 VAC service, transformed through a two-winding, isolation type transformer and rectified to low voltage DC for operation of all circuits and devices.
- H. Voice Control Unit:
 - 1. Provide Voice Control Unit and interconnection to existing Fire Alarm Control Panel.
 - 2. Program notification zones and voice messages as directed by Owner.

3.3 BOXES, ENCLOSURES AND WIRING DEVICES

- A. Boxes shall be installed plumb and firmly in position.
- B. Extension rings with blank covers shall be installed on junction boxes where required.
- C. Junction boxes served by concealed conduit shall be flush mounted.
- D. Upon initial installation, all wiring outlets, junction, pull and outlet boxes shall have dust covers installed. Dust covers shall not be removed until wiring installation when permanent dust covers or devices are installed.
- E. "Fire alarm system" decal or silk-screened label shall be applied to all junction box covers.

3.4 CONDUCTORS

- A. Each conductor shall be identified as shown on the drawings at each with wire markers at terminal points. Attach permanent wire markers within 2 inches of the wire termination. Marker legends shall be visible.
- B. All wiring shall be supplied and installed in compliance with the requirements of the National Electric Code, NFPA 70, Article 760, and that of the manufacturer.
- C. Wiring shall be in accordance with the approved color code for system conductors to allow rapid identification of circuit types.
- D. Wiring for strobe and audible circuits shall be a minimum 14 AWG, signal line circuits minimum 18 AWG twisted.
- E. All splices shall be made using solderless connectors. All connectors shall be installed in conformance with the manufacturer recommendations.
- F. Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.
- G. Wiring within sub panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

3.5 DEVICES

- A. Relays and other devices to be mounted in auxiliary panels are to be securely fastened to avoid false indications and failures due to shock or vibration.
- B. Wiring within panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.
- C. All devices and appliances shall be mounted to or in an approved electrical box.
- D. Provide additional wiring and terminations as needed for any existing device or power supply requiring relocation due to space / room renovations and reconfiguration.

3.6 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in 26 05 53 - Identification for Electrical Systems.
- B. Permanently label or mark each conductor at both ends with permanent alphanumeric wire markers.
- C. A consistent color code for fire alarm system conductors throughout the installation.

3.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

3.8 ADDITIONAL COMPONENTS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Provide labor and materials to provide (2) additional Ionization Area Smoke Detectors and 250 linear feet of fire alarm circuitry (in addition to those shown on plans). Install at locations as directed by Engineer.

2. Provide labor and materials to provide (2) additional Duct Smoke Detectors, 250 linear feet of fire alarm circuitry, and RTS (and control circuitry) in addition to those shown on plans. Install at locations as directed by Engineer.
3. Provide labor and materials to provide (2) additional Rate of Rise Temperature Heat Detectors and 250 linear feet of fire alarm circuitry (in addition to those shown on plans). Install at locations as directed by Engineer.
4. Provide labor and materials to provide (2) additional Fixed Temperature Heat Detectors and 250 linear feet of fire alarm circuitry (in addition to those shown on plans). Install at locations as directed by Engineer.

3.9 FIELD QUALITY CONTROL

A. Testing General:

1. All Alarm Initiating Devices shall be observed and logged for correct zone and sensitivity. These devices and their bases shall be tagged with adhesive tags located in an area not visible when installed, showing the initials of the installing technician and date.
2. Wiring runs shall be tested for continuity, short circuits and grounds before system is energized. Resistance, current and voltage readings shall be made as work progresses.
3. The acceptance inspector shall be notified before the start of the required tests. All items found at variance with the drawings or this specification during testing or inspection by the acceptance inspector shall be corrected.
4. Test reports shall be delivered to the acceptance inspector as completed.
5. All test equipment, instruments, tools and labor required to conduct the system tests shall be made available by the installing contractor. The following equipment shall be a minimum for conducting the tests:
 - a. Ladders and scaffolds as required to access all installed equipment.
 - b. Multi-meter for reading voltage, current and resistance.
 - c. Two way radios, and flashlights.
 - d. A manufacturer recommended device for measuring air flow through air duct smoke detector sampling assemblies.
 - e. Decibel meter.
 - f. In addition to the testing specified to be performed by the installing contractor, the installation shall be subject to test by the acceptance inspector.

3.10 ACCEPTANCE TESTING

- A. A written acceptance test procedure (ATP) for testing the fire alarm system components and installation will be prepared by the engineer in accordance with NFPA 72 and this specification. The contractor shall be responsible for the performance of the ATP, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and programming.
- B. A program matrix shall be prepared by the installing contractor referencing each alarm input to every output function affected as a result of an alarm condition on that input.
- C. The installing contractor prior to the ATP shall prepare a complete listing of all device labels for alphanumeric annunciator displays.
- D. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests shall be witnessed by the owner and test results recorded for use at the final acceptance test.
- E. Preliminary Testing: Conduct preliminary tests to ensure that all devices and circuits are functioning properly. After preliminary testing is complete, provide a letter certifying that the installation is complete and fully operable. The letter shall state that each initiating and indicating device was tested in place and functioned properly. The letter shall also state that all panel functions were tested and operated properly. The Contractor and an authorized

representative from each supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.

- F. Final Acceptance Test: Notify the owner in writing when the system is ready for final acceptance testing. Submit request for test at least 14 calendar days prior to the test date. A final acceptance test will not be scheduled until Megger test results, the loop resistance test results, and the submittals required in Part 1 are provided to the owner. Test the system in accordance with the procedures outlined in NFPA 72.
1. Verify that the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
 2. Test each initiating and indicating device and circuit for proper operation and response. Disconnect the confirmation feature for smoke detectors during tests to minimize the amount of smoke or test gas needed to activate the detector.
 3. Test the system for all specified functions in accordance with the contract drawings and specifications and the manufacturer's operating and maintenance manual.
 4. Visually inspect all wiring.
 5. Verify that all software control and data files have been entered or programmed into the FACP.
 6. Verify that Shop Drawings reflecting as-built conditions are accurate.
 7. Measure the current in circuits to assure that there is the calculated spare capacity for the circuits.
 8. Measure voltage readings for circuits to assure that voltage drop is not excessive.
 9. Measure the voltage drop at the most remote appliance on each notification appliance circuit.
- G. The acceptance inspector shall use the system record drawings in combination with the documents specified in this specification during the testing procedure to verify operation as programmed. In conducting the ATP, the acceptance inspector shall request demonstration of any or all input and output functions. The items tested shall include but not be limited to the following:
1. System wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:
 - a. Open, shorted and grounded signal line circuits.
 - b. Open, shorted and grounded notification, releasing circuits.
 - c. Primary power or battery disconnected.
 2. System notification appliances shall be demonstrated as follows:
 - a. All alarm notification appliances actuate as programmed.
 - b. Audibility and visibility at required levels.
 3. System indications shall be demonstrated as follows:
 - a. Correct message display for each alarm input at the control display.
 - b. Correct annunciator light for each alarm input at each annunciator and graphic display as shown on the drawings.
 - c. Correct history logging for all system activity.
 4. System off-site reporting functions shall be demonstrated as follows:
 - a. Correct zone transmitted for each alarm input.
 - b. Trouble signals received for disconnect.
 5. Secondary power capabilities shall be demonstrated as follows:
 - a. System primary power shall be disconnected for a period of time as specified herein. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period as specified.
 - b. System primary power shall be restored for forty-eight hours and system-charging current shall be normal trickle charge for a fully charged battery bank.
 - c. System battery voltages and charging currents shall be checked at the fire alarm control panel.

3.11 DOCUMENTATION

- A. System documentation shall be furnished to the owner and shall include but not be limited to the following:
 - 1. System record drawings and wiring details including one set of reproducible drawings, and a Flash drive with copies of the record drawings in PDF format.
 - 2. System operation, installation and maintenance manuals.
 - 3. System matrix showing interaction of all input signals with output commands.
 - 4. Documentation of system voltage, current and resistance readings taken during the installation, testing and ATP phases of the system installation.
 - 5. System program showing system functions, controls and labeling of equipment and devices.

3.12 PROTECTION

- A. Remove and replace devices and panel components that are wet, moisture damaged, or mold damaged.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal or protection of designated trees, shrubs, and other plant life.
- B. Removal of existing surface debris.
- C. Removing designated paving, curbs.
- D. Demolition and removal of above grade improvements.
- E. Disconnecting, capping or sealing, and removal/abandoned utilities.
- F. Excavating of subsoil and topsoil.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- D. Section 31 22 00 - Grading: Topsoil removal.
- E. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.3 DEFINITIONS

- A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in locations indicated.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.
- B. Historical items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be encountered during demolition, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

- C. The Contractor is responsible for cutting all marked trees to log length and stock piling the logs for the property owner on site at property owners designated location.

1.5 PROJECT CONDITIONS

- A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
 - 1. Protect improvements on adjoining properties and on Owner's property.
 - 2. Restore damaged improvements to their original condition, as acceptable to property owners.
- C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to remain at drip line.
- D. Salvageable Improvements: Carefully remove items indicated to be salvaged, and store on Owner's premises where indicated or directed.
- E. If indicated, Buildings to be demolished or relocated will be vacated and their use discontinued before start of Work.
- F. If indicated, Owner assumes no responsibility for actual condition of buildings to be demolished or relocated.
- G. Owner will maintain conditions existing at time of inspection for bidding purpose as far as practical.
- H. Storage or sale of removed items or materials on-site will not be permitted.
- I. Explosives: Use of explosives will not be permitted.

1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
 - 1. Vegetation removal limits.
 - 2. Areas for temporary construction and field offices.
- C. Schedule of demolition activities indicating the following:
 - 1. The Owner reserves the right to claim any material scheduled for demolition. No demolition materials are to be removed from job site without approval of the Construction Manager.
 - 2. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
 - 3. Dates for shutoff, capping, and continuation of utility services.
- D. Inventory of items to be removed and salvaged.
- E. Inventory of items to be removed by Owner.
- F. Photographs and videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by demolition operations.

- G. Record drawings at Project closeout according to Division 1 Section "Contract Closeout."
 - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.7 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Clearing Firm: Company specializing in the type of work required.
 - 1. Minimum of 3 years of documented experience.

1.8 SCHEDULING

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

PART 2 PRODUCTS

2.1 MATERIALS

- A. Fill Material: As specified in Section 31 23 23 - Fill and Backfill.
- B. Herbicides: Not allowed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.
- C. Identify salvage area for placing removed materials.
- D. Verify that utilities have been disconnected and capped.
- E. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- F. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- G. Survey the condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition or relocation.
- H. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.2 INITIAL PREPARATION

- A. Call Local Utility One Call Center @ 811 in the State of New York, not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping as specified in Section 01 50 00 - Temporary Facilities and Controls.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
- C. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
- D. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving structures to be demolished.
- E. Owner will arrange to shut off indicated utilities when requested by Contractor.
- F. Utility Requirements: Refer applicable specification sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.5 PREPARATION

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.
- B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
- C. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- D. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.
- E. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
- F. Protect existing site improvements, appurtenances, and landscaping to remain.
- G. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings to be demolished or related and adjacent buildings to remain.
- H. Strengthen or add new supports when required.

3.6 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
- B. Do not create hazardous or objectionable conditions, such as ice, flooding, and pollution, when using water.
- C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- D. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
- E. Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before start of demolition.

3.7 CLEARING

- A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps, roots, and branches.
- B. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.
- C. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over ½" inch in diameter, and without weeds, roots, and other objectionable material.
- D. Do not remove wet topsoil.
- E. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
 - 1. Do not remove topsoil from site.
- F. Remove heavy growths of grass from areas before stripping.
- G. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
- H. Stockpile topsoil in storage piles. Construct storage piles on site to a depth not exceeding 8 feet and protect from erosion. Cover storage piles, if required, to prevent wind erosion.
- I. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
- J. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.
- K. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.
- L. Clear areas required for access to site and execution of Work to minimum depth of 12 inches.
- M. Clear undergrowth and deadwood, without disturbing subsoils.
- N. Removed timber and stumps that are unwanted by the Owner or landowner shall be properly disposed of.

3.8 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove paving, walks and curbs as indicated on Drawings. Neatly saw cut edges at right angle to surface and at right angles to adjoining structures. Saw cut concrete pavement as indicated at locations shown on drawings nearest to existing joint.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

3.9 DEMOLITION

- A. Building Demolition: Demolish buildings completely and remove all building debris from the site. Use methods required to complete Work within limitations of governing regulations and as follows:
- B. Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- C. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
- D. Demolish concrete and masonry in small sections.
- E. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- F. Break up and remove concrete slab on grade, unless or shown to remain on drawings.
- G. Below-Grade Construction: Demolish foundation walls and other below-grade construction, as follows:
- H. Unless directed otherwise completely remove below-grade construction, including foundation walls and footings, and concrete slabs.
- I. Break up and remove below-grade concrete slabs, unless indicated to remain.
- J. Filling Below-Grade Areas: Completely fill below-grade areas and voids resulting from demolition of buildings and pavements with soil materials as required.
- K. Damages: Promptly repair damages to adjacent facilities caused by demolition operations.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of topsoil.
- B. Removal of subsoil.
- C. Rough grading cutting, filling, rough contouring, compacting, and finished grading the site for site structures, building pads, and trenches.
- D. Finish grading.

1.2 RELATED REQUIREMENTS

- A. Section 31 10 00 - Site Clearing.
- B. Section 31 23 16 - Excavation.
- C. Section 31 23 16.13 - Trenching: Trenching and backfilling for utilities.
- D. Section 31 23 23 - Fill: Filling and compaction.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with Department of Transportation Standards in the State of New York.
- B. Maintain one copy of all construction documents on site.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil: See Section 31 23 23.
- B. Other Fill Materials: See Section 31 23 23.

PART 3 EXECUTION

3.1 EXAMINATION

- A. See Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify that survey bench mark and intended elevations for the Work are as indicated.
- C. Verify the absence of standing or ponding water.

3.2 PREPARATION

- A. Call Local Utility One Call Center @ 811 in the State of New York, not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Stake and flag locations of known utilities.
- D. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- E. Notify utility company to remove and relocate utilities.
- F. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- G. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- H. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- I. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.3 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil .
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.
- G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- H. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.4 SOIL REMOVAL AND STOCKPILING

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
- B. Stockpile subsoil to be re-used on site; remove remainder from site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.5 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.

2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 4 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.
- E. Place topsoil in areas where seeding are indicated.
- F. Place topsoil where required to level finish grade.
- G. Place topsoil to thickness as indicated.
- H. Place topsoil during dry weather.
- I. Remove roots, weeds, rocks, and foreign material while spreading.
- J. Near plants spread topsoil manually to prevent damage.
- K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- L. Lightly compact placed topsoil.
- M. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.6 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.7 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.8 FIELD QUALITY CONTROL

- A. See Section 31 23 23 for compaction density testing.
- B. Perform laboratory material tests in accordance with Department of Transportation Standards in the State of New York.
- C. Perform in place compaction tests in accordance with Department of Transportation Standards in the State of New York.
 1. Density Tests.
 2. Moisture Tests.
- D. When tests indicate work does not meet specified requirements, remove work, replace and retest.

3.9 CLEANING

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavating for footings, pile caps, slabs-on-grade, paving, site structures, and landscaping.
- B. Trenching for utilities outside the building to utility main connections.
- C. Soil densification

1.2 RELATED REQUIREMENTS

- A. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- B. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicated soil densification grid for each size and configuration footing requiring soils densification.
- C. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

1.4 QUALITY ASSURANCE

- A. Fill Material Tests: A sieve analysis, loss on ignition, and magnesium sulfate soundness test shall be taken for each type of material from each source of material. Tests will be in accordance with appropriate ASTM methods. Tests shall be taken by an approved independent laboratory and results submitted directly to the Architect before such material is used for fill. Material which fails to meet the specified requirements shall be removed from the site. Payment for tests shall be as described in General Requirements.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.

- B. Protect utilities that remain and protect from damage.
- C. Call Local Utility One Call Center @ 811 in the State of New York, not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- D. Notify utility company to remove and relocate utilities.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Protect plants, lawns, and other features to remain.
- G. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.3 GENERAL EXCAVATION

- A. Excavate to accommodate building foundations, slab on grade, and paving, construction operations and site structures.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.
- F. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- G. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 23 and Section 31 23 16.13.
- H. Repair or replace any items indicated to remain damaged by excavation.

3.4 SUBGRADE PREPARATION

- A. See Section 31 23 23 for subgrade preparation at general excavations.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.6 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.
- F. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earth operations.

END OF SECTION

SECTION 31 23 16.13
TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavation trenches for utilities outside the buildings to utility main connections.
- B. Compacted fill from top of utility bedding to subgrade elevations.
- C. Backfilling and compaction.

1.2 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Site grading.
- B. Section 31 23 16 - Excavation: Building and foundation excavating.
- C. Section 31 23 23 - Fill: Backfilling at building and foundations.

1.3 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: Indicated on drawings.
- C. Utility: Any buried pipe, duct, conduit, or cable.

1.4 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2012, with Editorial Revision (2015).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: 10 pound sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

- E. Compaction Density Test Reports.
- F. Product Data: Submit data for geo-textile fabric indicating fabric and construction.
- G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where designated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

1.7 QUALITY ASSURANCE

- A. Perform work in accordance with Department of Transportation Standards in the State of New York.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 COORDINATION

- A. See Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. See Section 31 23 23 - Fill.

2.2 ACCESSORIES

- A. Geotextile: Non-biodegradable, woven.

2.3 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 22 00 for additional requirements.
- C. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.3 TRENCHING

- A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.
- H. Remove excavated material that is unsuitable for re-use from site.
- I. Stockpile excavated material to be re-used in area designated in Section 31 22 00.
- J. Remove excess excavated material from site.
- K. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- L. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.
- M. Do not advance open trench more than 100 feet ahead of installed pipe.
- N. Excavate bottom of trenches maximum of 2 feet wider than outside diameter of pipe or as indicated on plans.
- O. Excavate trenches to depth indicated on drawings. Provide uniform and continuous bearing and support for bedding material and pipe utilities.
- P. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section or as required by OSHA.

- Q. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered. Notify Architect/Engineer, and request instructions prior to excavation.
- R. Cut out soft areas of sub-grade not capable of compaction in place. Backfill with approved fill material and compact to density equal to or greater than requirements for subsequent backfill material.
- S. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

3.4 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.5 BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
 - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
- H. Reshape and re-compact fills subjected to vehicular traffic.
- I. Place geotextile fabric over bedding fill prior to placing subsequent fill materials.
- J. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
- K. Employ placement method that does not disturb or damage foundation perimeter drainage, utilities in trench, and other below grade improvements.
- L. Do not leave open trenching at end of working day.
- M. Protect open trenches at all times during installation of trenching.

3.6 BEDDING AND FILL AT SPECIFIC LOCATIONS

- A. Use general fill unless otherwise specified or indicated.

3.7 TOLERANCES

- A. See Section 01 40 00 - Quality Requirements: Tolerances.

- B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
- C. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.8 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: 1 for every 50 feet of trench.

3.9 CLEANING

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31 23 23

FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Filling, backfilling, and compacting for footings, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.2 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Removal and handling of soil to be re-used.
- B. Section 31 22 00 - Grading: Site grading.
- C. Section 31 23 16 - Excavation: Removal and handling of soil to be re-used.
- D. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.3 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.

1.4 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.
- B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.
- C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2012, with Editorial Revision (2015).
- F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Soil Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.
 - 1. Provide test of topsoil at a rate of one sample per 100 cubic yards.

2. Stockpiled on-site topsoil shall be sampled from multiple locations within the stockpile.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
 1. Fill Composition Test Reports shall be conducted within twelve months prior to submission.
- E. Compaction Density Test Reports.
- F. Testing Agency Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where designated.
 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 2. Prevent contamination.
 3. Protect stockpiles from erosion, deterioration, and offsite impacts of materials.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. General Fill: Native or imported material.
 1. Material used to meet grade, unless otherwise noted.
 2. Free of lumps larger than 3 inches, rocks larger than 3 inches, organics, trash, and debris.
 3. Complying with ASTM D2487 Group Symbol GW, GP, GM, SM, SW, or SP.
- B. Select Native Fill: Subsoil excavated on-site.
 1. Ungraded.
 2. Free of lumps larger than 6 inches, rocks larger than 6 inches, organics, trash, and debris.
 3. Complying with ASTM D2487 Group Symbol GW, GP, GM, SM, SW, or SP.
- C. Structural Fill: Conforming to DOT Standards in the State of New York.
- D. Granular Fill: Coarse aggregate, conforming to DOT Standards in the State of New York.
- E. Granular Fill - Pea Gravel: Natural stone; washed, free of clay, shale, organic matter.
- F. Sand - Fill Type Cushion Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
 1. Graded in accordance with ASTM C136/C136M; within the following limits:
 - a. No. 50 sieve: 0 to 35 percent passing.
 - b. No. 100 sieve: 0 to 10 percent passing.

- G. Sand - Fill Type Concrete Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
 - 1. Graded in accordance with ASTM C136/C136M; within the following limits:
 - a. No. 4 sieve: 90 - 100 percent passing.
 - b. No. 8 sieve: 75 - 100 percent passing.
 - c. No. 16 sieve: 50 - 85 percent.
 - d. No. 30 sieve: 25 - 60 percent.
 - e. No. 50 sieve: 10 to 30 percent passing.
 - f. No. 100 sieve: 1 to 10 percent passing.
 - g. No. 200 sieve (wet): 0 - 3 percent passing.
- H. Topsoil: Topsoil excavated on-site.
 - 1. Select.
 - 2. Free of roots, lumps larger than 4 inches, rocks larger than 1-1/2 inch, subsoil, debris, large weeds and foreign matter.
 - 3. Acidity range (pH) of 5.5 to 7.5.
- I. Topsoil: Topsoil excavated on-site, tested and amended as required to meet the following:
 - 1. Select.
 - 2. Handle excavated topsoil in accordance with Section 31 22 00 - Grading.
 - 3. Double screened on site prior to placement.
 - 4. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter, including but not limited to woody material, trash and glass.
 - 5. Acidity range (pH) of 5.5 to 7.5.
 - 6. Complying with ASTM D2487 Group Symbol OH.
- J. Topsoil: Friable loam; imported borrow.
 - 1. Select.
 - 2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
 - 3. Acidity range (pH) of 5.5 to 7.5.
 - 4. Containing a minimum organic matter of 4 percent of total content by volume.
 - 5. Complying with ASTM D2487 Group Symbol OH.
 - 6. USDA Textural Soil Classification: Percentage of clay, silt, and sand; defined as Sandy Loam.
- K. Drainage Fill: Material shall consist of crushed stone or screened gravel:

U.S. Sieve No.	Percent Passing by Weight
1 inch	100
1/2 inch	30-100
1/4 inch	0-30
No. 10	0-10
No 20	0-5

- L. Pipe Bedding Stone: Material shall consist of crushed stone:

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven, fabric ; 500X manufactured by Mirafi , or approved equal.
- B. Filter Fabric: Non-biodegradable, non-woven, fabric; Mirafi 140N, or approved equal.
- C. Geotextile Fabric for Perforated Drain Pipe: Non-biodegradable, non-woven, fabric; Mirafi 140N, or approved equal.

2.3 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. See Section 31 22 00 for additional requirements.
- D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- E. Verify structural ability of unsupported walls to support imposed loads by the fill.
- F. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- G. Verify areas to be filled are not compromised with surface or ground water.

3.2 PREPARATION

- A. Scarify subgrade surface to a depth of 8 inches.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type directed by Owner's Representative.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.
- E. Under structural elements and paving, the subgrade and subbase shall be proof rolled. Contact Engineer or Owners representative 24 hours before testing. If subgrade stabilization or undercutting is designed for the project, then proof rolling shall be used to verify the undercut replacement material stability.
- F. Proof rolling deflections and soil conditions that are observed during construction determine if the planned subgrade treatment must be adjusted. Adjustment of subgrade treatment to fit field conditions is essential and is the responsibility of the contractor.
- G. When rutting and deflection occur under wheels of 10-wheel dump truck engineer or representative will require corrective action.
- H. Improve subbase or subgrade by undercutting wet material, aeration of wet soil or use of additional subbase material. Compact material and proof roll again.
- I. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- G. Slope grade away from building minimum 2 percent slope for minimum distance of 5 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
 - 1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 95 percent of maximum dry density.
 - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.
- K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- L. Remove surplus backfill materials from site.

3.4 FILL AT SPECIFIC LOCATIONS

- A. Use fill type indicated unless otherwise indicated in the geotechnical report.
- B. At Lawn Areas:
 - 1. Use general fill.
 - 2. Compact to 95 percent of maximum dry density.
 - 3. See Section 31 22 00 for topsoil placement.

3.5 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.
- C. Top Surface of Filling Within Building Areas: Plus or minus 1/2 inch from required elevations.

3.6 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938. Contractor shall be responsible for providing compaction testing as part of their base bid contract. Slab testing shall be every 100 square feet of area or every 50-ft of trench excavation.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: 1 per 2500 sq. ft, or as directed by Engineer.
- F. Proof roll compacted fill at surfaces that will be under slabs-on-grade, pavers, and paving.

3.7 CLEANING

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

3.8 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aggregate base course.

1.2 RELATED REQUIREMENTS

- A. Section 31 23 23 - Fill: Compacted fill under base course.
- B. Section 32 12 16 - Asphalt Paving: Finish and binder asphalt courses.

1.3 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2012, with Editorial Revision (2015).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017.
- G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Samples: 10 lb sample of each type of aggregate; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction Density Test Reports.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When aggregate materials need to be stored on site, locate where indicated on drawings.
- C. Aggregate Storage, General:

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
2. Prevent contamination.
3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Coarse Aggregate: As specified in Section 31 23 23.
- B. Coarse Aggregate: Coarse aggregate, conforming to Department of Transportation Standards in the State of New York.
- C. Geotextile: Nonbiodegradable, woven.

2.2 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for general requirements for testing and analysis of aggregate materials.
- B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.3 INSTALLATION

- A. Spread aggregate over prepared substrate to a total compacted thickness as indicated on Drawings.
- B. Place aggregate in maximum 4 inch layers and roller compact to specified density.
- C. Level and contour surfaces to elevations and gradients indicated.
- D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Variation From Design Elevation: Within 1/2 inch.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection and testing.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: 1 per 2500 sq. ft. or as required by the Engineer.
- F. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.6 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single course bituminous concrete paving.
- B. Double course bituminous concrete paving.
- C. Surface sealer.

1.2 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Preparation of site for paving and base.
- B. Section 31 23 23 - Fill: Compacted subgrade for paving.
- C. Section 32 11 23 - Aggregate Base Courses: Aggregate base course.

1.3 REFERENCE STANDARDS

- A. AI MS-2 - Asphalt Mix Design Methods; 2015.
- B. AI MS-19 - Basic Asphalt Emulsion Manual; 2008.
- C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. See Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene pre-installation meeting a minimum of one week prior to commencing work of this section. Attendance by Architect/ Engineer, Construction Manager, Owner, and Contractor.
- C. Schedule a proof roll of subbase prior to asphalt installation.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit proposed mix design of each class of mix for review prior to beginning of Work.
 - 1. Each mix design shall be certified and signed by the respective State Department of Transportation within two years preceding submittal.
- C. Product Data: Provide product data on each additional product required, including, but not limited to primer, tack coat, and joint sealant.
- D. Asphalt Pavement Work Plan: Indicate paving pass width, paving directions, site access, and coordination of timing with other installations.
- E. Installers qualification statement.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Department of Transportation Standards in the State of New York.

- B. Mixing Plant: Conform to Department of Transportation Standards in the State of New York.
- C. Obtain materials from same source throughout.
- D. Installer Qualifications: Company specializing in performing work of this section with minimum 10 years documented experience.

1.7 FIELD CONDITIONS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen, and as further provided:

TEMPERATURE REQUIREMENTS	
Nominal Compacted Lift Thickness	Surface Temperature Minimum
No greater than 1 inch	50 degrees F.
1 inch through 3 inches	45 degrees F.
Greater than 3 inches	40 degrees F.

- C. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Asphalt Cement: Conforming to Department of Transportation Standards in the State of New York.
- B. Aggregate for Binder Course: Conforming to Department of Transportation Standards in the State of New York.
- C. Aggregate for Wearing Course: Conforming to Department of Transportation Standards in the State of New York.
- D. Fine Aggregate: Sand in conformance with Department of Transportation Standards in the State of New York.
- E. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.
- F. Primer: Homogeneous, medium curing, liquid asphalt in accordance with Department of Transportation Standards in the State of New York.
- G. Tack Coat: Homogeneous and Emulsified asphalt conforming to Department of Transportation Standards in the State of New York.
- H. Joint Sealant: Asphalt joint sealant meeting ASTM D6690 Type II or IV requirements.
- I. Seal Coat: AI MS-19, Seal Master LV concentrate pavement sealer. Manufactured by SealMaster, 800-395-7325, www.sealmaster.net or approved equal.
- J. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt concrete pavements.

2.2 ASPHALT PAVING MIXES AND MIX DESIGN

- A. Use dry material to avoid foaming. Mix uniformly.
- B. Binder Course: State of New York Highways standards: Superpave 25mm Binder.
- C. Wearing Course: State of New York Highways standards: Superpave 9.5mm Top Course.
- D. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.3 SOURCE QUALITY CONTROL

- A. Test mix design and samples in accordance with AI MS-2.
- B. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

2.4 EQUIPMENT

- A. Hauling Equipment
 - 1. Trucks used for hauling asphalt shall have clean, smooth, tight metal beds.
 - a. Any debris from previous loads hauled shall be removed.
 - 2. The inside of the truck box shall be coated with a Department of Transportation approved release agent.
 - a. Petroleum products, (including but not limited to fuel oil, diesel fuel, kerosene, and gasoline) or solvents shall not be used.
 - 3. Trucks shall be equipped with waterproof covers that totally cover the asphalt load, the front of which is attached to prevent wind from entering under tarp during transport.
- B. Pavers
 - 1. Units shall be self-propelled and include receiving hopper, transfer system, and activated screed.
 - 2. Units shall provide automatic slope control.
 - 3. Units shall be equipped with screed heaters and joint pre-heaters.
- C. Rollers
 - 1. Rollers shall be of vibratory or static steel wheel design, of sufficient weight to adequately provide compaction rate specified.
 - 2. Furnish the following minimum roller quantities per project:
 - a. Total Rollers: Two.
 - b. Total Rollers: Three, when tonnage is 300 tons per day or greater.
 - c. In every instance, one of the required rollers shall be of a Vibratory Wheel design.
 - 3. Equipment shall be free from oil leaks.

PART 3 EXECUTION

3.1 EXAMINATION

- A. See Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.
- B. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- C. Verify gradients and elevations of base are correct.
- D. Verify that site improvement items scheduled within the paved area, including but not limited to bollards, sign posts, fence posts, gate operator foundations, and any utilities servicing such equipment are installed prior to paving operations.

- E. Verify gutter drainage grilles and frames manhole frames and curbing are installed in correct position and elevation.
- 3.2 AGGREGATE BASE COURSE
- A. See Section 32 11 23 - Aggregate Base Courses.
- 3.3 PREPARATION - PRIMER
- A. Apply primer in accordance with manufacturer's instructions and in conformance with Department of Transportation Standards in the State of New York.
 - 1. Primer shall be placed on aggregate base in all Department of Transportation right-of-ways.
 - B. Apply primer on aggregate base or subbase at uniform rate of 1/2 gal/sq yd.
- 3.4 PREPARATION - TACK COAT
- A. Apply tack coat in accordance with manufacturer's instructions.
 - B. Apply tack coat in accordance with Department of Transportation Standards in the State of New York.
 - 1. Apply tack coat between all pavement layers within Department of Transportation right-of-ways.
 - 2. Apply tack coat between pavement layers when:
 - a. Pavement is exposed to traffic.
 - b. Pavement is exposed to dirt and dust.
 - c. Forty eight hours have passed between courses.
 - C. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of .03 to .10 gallons per square yard.
 - D. Apply tack coat to all contact surfaces of curbs, gutters, manholes, and adjacent pavement edges.
 - E. Paving shall not commence until tack coat emulsion has broken or is tacky to the touch.
- 3.5 PREPARATION – SURFACE SEALER
- A. Surface must be clean and free of all loose material and dirt.
 - B. Pavement surface repairs shall be made with suitable hot or cold asphalt mix.
 - C. Cracks shall be filled with hot or cold pour filler.
 - D. Treat all grease, oil, gasoline spots or stains with SealMaster Petro Seal or Prep Seal, or approved equal.
- 3.6 PLACING ASPHALT PAVEMENT - SINGLE COURSE
- A. Install Work in accordance with Department of Transportation Standards in the State of New York.
 - B. Place asphalt within 24 hours of applying primer or tack coat.
 - C. Install gutter drainage grilles and frames in correct position and elevation.
 - D. Place asphalt wearing course to thickness as identified on construction drawings.
 - E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

1. Compaction should occur when asphalt course is between 150 and 185 degrees F.

F. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.7 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place asphalt wearing course within two hours of placing and compacting binder course.

C. Install gutter drainage grilles and frames in correct position and elevation.

D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

1. Compaction should occur when asphalt course is between 150 and 185 degrees F.

E. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.8 SEAL COAT

A. Shall be applied by either pressurized spray application equipment or self propelled squeegee equipment. *Pressurized spray equipment shall be capable of spraying pavement sealer with sand added, maintain continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer throughout the application process.* Self-propelled squeegee equipment shall have at least 2 squeegee or brush devices(one behind the other).

B. Hand squeegee and brushes shall be acceptable in areas where practicality prohibits the use of mechanized equipment.

C. Limitations: Shall not be applied when temperatures are expected to drop below 50 degrees F at anytime within a 24 hour period after application. When indicated to be applied over new asphalt surfaces, such surfaces shall be allowed to cure a minimum of four weeks under ideal weather conditions (70 degrees F) before application of surface sealer.

D. Mixing procedures for optimum results shall conform to product specifications.

E. Apply a minimum of 2 coats.

F. Apply at a rate of .11 to .13 gallon per square yard, (70-82 square feet per gallon) per coat.

3.9 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

C. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

D. Variation from True Elevation: Within 1/2 inch.

3.10 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with Department of Transportation Standards in the State of New York.

3.11 CLOSEOUT ACTIVITIES

A. See Section 01 70 00 - Execution and Closeout Requirements

- B. Documentation: Provide copies of Truck Loading Slips (bill of lading) for each load of each design mix of asphalt material used on site.

3.12 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for 3 days or until surface temperature is less than 140 degrees F.
- B. Surface Sealer drying time: 8 hours max.

END OF SECTION

SECTION 32 12 17
ASPHALT PAVING JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Asphalt and concrete paving crack sealants
- B. Hot pour mastics

1.2 RELATED REQUIREMENTS

- A. Section 32 12 16 - Asphalt Paving
- B. Section 32 13 13 - Concrete Paving

1.3 REFERENCE STANDARDS

- A. ASTM D113 - Standard Test Method for Ductility of Asphalt Materials; 2017
- B. ASTM D3111 - Standard Test Method for Flexibility Determination of Hot-Melt Adhesives by Mandrel Bend Test Method
- C. ASTM D36 - Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
- D. ASTM D5078 - Standard Specification for Crack Filler, Hot Applied, for Asphalt Concrete and Portland Cement Concrete Paving.(Reapproved 2016)
- E. ASTM D5329 - Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements; 2016
- F. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements; 2015

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this section with Owner, Architect, and all other trades involved in the project.
 - 1. Ensure work of this section is scheduled and carried out so as not to limit access to site.
- B. 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 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's product data sheets, performance criteria and installation instructions.
- C. Manufacturer's Instructions: Indicate preparation requirements, application limitations, and environmental conditions required for installation.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with Department of Transportation Standards in the State of New York in DOT Right-of-Ways.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- D. Obtain materials from same source throughout project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products specified herein to project site in manufacturer's unopened, undamaged packaging..
- B. Store products under cover and elevated above grade, and as recommended by manufacturer.
 - 1. Prevent damage due to moisture, temperature extremes, or contaminants.

1.8 FIELD CONDITIONS

- A. See Section 01 60 00 - Product Requirements,
- B. Ensure all application limitations including manufacturer's, temperature, and weather are within specified limits.

1.9 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year manufacturer warranty for each product.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Maxwell Products, Inc.: www.maxwellproducts.com.
- B. P&T Products, Inc.: www.p-tproductsinc.com.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Joint Sealants for parking lots and non-DOT right-of-ways.
 - 1. Polymer modified crack and joint sealant
 - 2. Conforming to ASTM D5078
 - 3. Basis of Design Product: Elastoflex 650 by Maxwell Products.
 - a. Or approved equal
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Joint Sealants for DOT right-of-ways.
 - 1. Polymer modified crack and joint sealant
 - 2. Conforming to ASTM D6690 Type I

3. Basis of Design Product: Elastoflex 410 by Maxwell Products.
 - a. Or approved equal
 4. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Hot Pour Mastic for wide cracks or surface repair:
1. Basis of Design Product: GAP B by Maxwell Products.
 - a. Or approved equal
 2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that all areas to receive work of this section are available, and conditions are favorable for work to proceed.

3.2 PREPARATION

- A. Prepare cracks for sealing on the same day they are to be sealed. Install suitable traps or devices on the compressed air equipment to prevent moisture and oil from contaminating the joint surfaces. Maintain these devices and see that they are functioning properly.
- B. Hot Air Lance: In order to thoroughly clean and dry cracks of dust, dirt, foreign material, sand and any other extraneous materials immediately prior to sealing joints. Using compressed air no lower than 90 cfm to 185 cfm, the operator shall blow dry the affected cracks to receive the hot pour sealant. To clean and ensure a dry condition, a hot air lance capable of reaching temperatures ranging from a low end 600 degrees F to 2,000 degrees F shall be used. Do not burn, or scorch the adjoining pavement when using a hot air lance.
 1. The hot air lance preparation shall not exceed 200 yards in front of the sealing operation. The compressor delivering the pressurized air shall have functional water and oil separators to ensure no moisture is injected into the cracks.

3.3 SEALANT MELTING

- A. Heat and melt the sealant in a melter constructed either as a double boiler filled with a heat-transfer medium between the inner and outer shells, or with internal tubes or coils carrying the sealant through a heated oil bath and into a heated double wall hopper. The melter will be equipped with separate thermometers to indicate the temperature of the heat transfer medium and the sealant material, positive temperature controls and with a mechanical agitator and recirculating pumping of sealant to assure a homogeneous blend of the sealant. Maintain the sealant temperature inside the tank at the manufacturer's recommended pouring temperature as indicated on the material packaging of the sealant.
- B. To ensure proper sealant application temperature check the discharge of the sealant with a non-contact infrared thermometer. Discharge the sealant at a temperature between the manufacturer's recommended pouring and safe heating temperatures indicated on the material packaging.
- C. Sealing is not permitted if the melter and discharge temperatures do not meet with the requirements described above. Circulate the sealant from the discharge hose and the melter to maintain the proper sealant pouring temperature.
- D. Do not use sealant material heated beyond the safe heating temperature. If the manufacturer's recommendations allow the sealant to be reheated or heated in excess of six hours, recharge the melter with fresh material amounting to at least 20 percent of the volume of the material remaining in the melter.

3.4 PLACING JOINT SEALANT

- A. Sealing is to be done when ambient air temperature is at or above 40F. Seal the routed crack by placing the applicator wand in or directly over the recess and carefully discharge the sealant. Strike-off the sealant flush with the pavement surface so that only a narrow thin film of material measuring no wider than 2 inches wide and 1/16 inch thick is allowed on the pavement surface after sealing the reservoir. Properly sealed joints shall be watertight.
- B. A low pressure, light spray of water or a manufacturer recommended barrier spray may be used to accelerate cooling of the sealant and allow traffic on it without tracking. Blotting the sealant with fine aggregate is not allowed.
- C. Remove and dispose sealant in excess of the specified thin "film" dimensions or that has not bonded to both sides of the reservoir.

3.5 WIDE CRACKS AND PATCHING

- A. Cracks wider than one inch, small potholes and other pavement imperfections as outlined by the Engineer are to be repaired and filled with the hot pour mastic.
- B. Preparing the repair areas is the same process used for crack sealing as outlined above. Equipment used for the heating of the mastic shall conform with the same standards outlined for crack sealing with the exception of having any activity requiring the recirculation or pumping of the material. Due to the high abrasive content of the aggregate no pumping can be used. A gravity discharge directly into the repair area or a box screen applicator shall be used to fill and repair the pavement. To install a proper filled and waterproof repair heated flat stock steel shall be used to ensure the material overbids the repair by 2 inches on all sides. The hot steel plate shall be used to smooth the surface of the mastic.
- C. When manufacturers require a primer prior to installation or a finishing stone topping, it shall be applied in accordance with the materials installation instructions supplied by the manufacturer.
- D. No traffic shall be allowed on top of the mastic repair unit the temperature cools to ensure no damage to the repair or oncoming traffic.

3.6 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.7 PROTECTION

- A. Protect installed joint sealants and patches from subsequent construction operations.
- B. Protect sealed areas from vehicular and pedestrian traffic until products have set sufficiently to prevent tracking of sealants.

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, and roads.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 07 92 00 - Joint Sealant: Sealing joints.
- C. Section 31 22 00 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- D. Section 31 23 23 - Fill: Compacted subbase for paving.
- E. Section 32 12 16 - Asphalt Paving: Asphalt wearing course.

1.3 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete; 2016.
- C. ACI 305R - Guide to Hot Weather Concreting; 2010.
- D. ACI 306R - Guide to Cold Weather Concreting; 2016.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- F. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2019a.
- H. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- I. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2017.
- J. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- K. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.

- C. Samples: Submit two sample panels, 12 by 12 inch in size illustrating exposed aggregate finish.

PART 2 PRODUCTS

2.1 PAVING ASSEMBLIES

- A. Comply with applicable requirements of Department of Transportation Standards in the State of New York.

2.2 FORM MATERIALS

- A. Form Materials: As specified in Section 03 30 00, conform to ACI 301.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
 - 1. Product:

2.3 REINFORCEMENT

- A. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish.

2.4 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: As specified in Section 03 30 00.

2.5 ACCESSORIES

- A. Curing Compound: Conforming with Department of Transportation Standards in the State of New York.
- B. Liquid Surface Sealer: Conforming with Department of Transportation Standards in the State of New York.

2.6 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Concrete Properties:
 - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 4,000 psi.
 - 2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
 - 3. Cement Content: Minimum 605 lb per cubic yard.
 - 4. Water-Cement Ratio: Maximum 40 percent by weight.
 - 5. Total Air Content: 5.0 to 8.0 percent, determined in accordance with ASTM C173/C173M.

6. Maximum Slump: 4 inches.
7. Maximum Aggregate Size: 1 inch.

2.7 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.2 SUBBASE

- A. See Section 32 11 23 for construction of base course for work of this Section.

3.3 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.
- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.4 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.5 REINFORCEMENT

- A. Place reinforcement at as indicated on the construction drawings.
- B. Interrupt reinforcement at expansion joints.

3.6 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.7 PLACING CONCRETE

- A. Coordinate installation of snow melting components.
- B. Place concrete as specified in Section 03 30 00.

- C. Do not place concrete when base surface is wet.
- D. Place concrete using the slip form technique.
- E. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- F. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- G. Place concrete to pattern indicated.

3.8 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 1/2 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/4 inch of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints.
 - 1. As indicated on plan.
 - 2. At 5 feet intervals.
 - 3. Between sidewalks and curbs.
 - 4. Between curbs and pavement.
 - 5. Scores to be a 2" tooled joint.
- D. Provide keyed joints as indicated.
- E. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.
- F. Joint Sealants:
 - 1. Apply joint sealants to expansion joints, and other areas indicated.
 - 2. See Section 07 92 00 - Joint Sealant for sealant type and application.
 - 3. In addition to the requirements of 07 92 00, apply sealants prior to first freezing temperatures, and when substrate can be maintained at 40 degrees F, minimum for 48 hours prior to and 72 hours following application.

3.9 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Median Barrier: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- D. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- E. Inclined Vehicular Ramps: Broomed perpendicular to slope.
- F. Place sealer on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

- B. Maximum Variation From True Position: 1/4 inch.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
 - 2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
 - 3. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
 - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 2. Perform one slump test for each set of test cylinders taken.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.12 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 33 42 11
SITE STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stormwater drainage piping.
- B. Stormwater pipe accessories.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.
- B. Section 31 23 16 - Excavation: Excavating of trenches.
- C. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.
- D. Section 31 23 23 - Fill: Bedding and backfilling.

1.3 PRICE AND PAYMENT PROCEDURES

- A. Pipe and Fittings:
 - 1. Basis of Measurement: By the linear foot.
 - 2. Basis of Payment: Includes hand trimming excavation, bedding and backfilling, pipe and fittings, connection to building service piping and to municipal system.

1.4 REFERENCE STANDARDS

- A. ASTM C14 - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe; 2015a.
- B. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2019.
- C. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).
- D. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2018.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating pipe, pipe accessories.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
- E. Project Record Documents:
 - 1. Record location of pipe runs, connections, and invert elevations.
 - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.1 STORMWATER PIPE MATERIALS

- A. Plastic Pipe: ASTM D2729, Poly Vinyl Chloride (PVC) material; inside nominal diameter of 4-15 inches, bell and spigot style solvent sealed joint end.
- B. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) corrugated wall pipe with integrally formed smooth liner; inside nominal diameter of 3 - 60 inch, meeting the requirements of AASHTO M 252, Type S, for diameters between 3 inches and 10 inches and AASHTO M 294, Type S, for diameters between 12 inches and 60 inches, soil-tight, bell and spigot joints with rubber gaskets, with pipe and fittings manufactured from virgin PE compounds with cell classification 3254420C, or better.

2.2 PIPE ACCESSORIES

- A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.
- B. Filter Fabric: Non-biodegradable, woven.
- C. Trace Wire: Magnetic detectable conductor, clear plastic covering, minimum 6 inches wide by 4 mil thick, imprinted with "Storm Sewer Service " in large letters, for direct burial service.

2.3 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Section 31 23 16.13.
- B. Cover: As specified in Section 31 23 16.13.

PART 3 EXECUTION

3.1 TRENCHING

- A. See Section 31 23 16.13 - Trenching for additional requirements.
- B. Hand trim excavation for accurate placement of pipe to elevations indicated.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling to provide top cover to minimum compacted thickness of 12 inches exclusive of asphalt or concrete, compacted to 95%.

3.2 INSTALLATION

- A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.
- B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D2321.
- C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

- D. Connect to building storm drainage system, foundation drainage system, and utility/municipal system.
- E. Make connections through walls through sleeved openings, where provided.
- F. Install continuous trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.3 FIELD QUALITY CONTROL

- A. Perform field inspection in accordance with Section 01 40 00 - Quality Requirements.

3.4 PROTECTION

- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.
- B. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION