

ONEIDA COUNTY DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING

**SPECIFICATION BOOK
FOR
BID REFERENCE No. 2292**

CORNELL COOPERATIVE EXTENSION
ADDITION & ALTERATIONS
121 SECOND STREET, ORISKANY, NY 13424

BID PACKAGES:

GENERAL CONSTRUCTION - CONTRACT No. H2456001
PLUMBING CONSTRUCTION - CONTRACT No. H2456002
MECHANICAL CONSTRUCTION - CONTRACT No. H2456003
ELECTRICAL CONSTRUCTION - CONTRACT No. H2456004

MARCH 13, 2025

IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR ARCHITECT, TO ALTER ANY ITEM ON THIS DOCUMENT IN ANY WAY.

PREPARED BY
MARCH ASSOCIATES, ARCHITECTS AND PLANNERS, P.C.
258 GENESEE STREET, SUITE 300, UTICA, NY 13502

ANTHONY J. PICENTE, JR.
ONEIDA COUNTY EXECUTIVE

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ADVERTISEMENT - INVITATION TO BID

Sealed Bids, subject to the conditions contained herein, will be received by the ONEIDA COUNTY DEPARTMENT OF PURCHASING until **2:00 p.m. local time on Tuesday, April 29th, 2025**, and then publicly opened and read, for furnishing all labor and materials and performing all work for:

Bid Ref. #2292
Cornell Cooperative Extension
Addition & Alterations
121 Second Street, Oriskany, NY 13424
GENERAL CONSTRUCTION – CONTRACT NO. H2456001
PLUMBING CONSTRUCTION – CONTRACT NO. H2456002
MECHANICAL CONSTRUCTION – CONTRACT NO. H2456003
ELECTRICAL CONSTRUCTION – CONTRACT NO. H2456004

The Contract Documents may be viewed and ordered through the **Avalon Plan Room** website at: www.avalonplanroom.com in the “Public Bid” section. If you do not have internet access or have questions on ordering from the site, please contact Avalon Document Services at (315) 724-5555. Drawings can be picked up at any of Avalon Document Services’ locations.

A non-refundable deposit of Forty Five Dollars (\$45.00) payable to Avalon Document Services will be required to obtain the Proposal Booklet and a USB with an electronic version of the Contract Documents. Cash payments will not be accepted. The payment includes shipping of the Proposal Booklet and USB to anywhere in the Continental United States **via UPS or Fed Ex ground. Should potential bidders want expedited shipping they should include their UPS or FedEx account number with their planroom order, or be charged additional shipping at their expense.** By submission of the \$45.00 non-refundable payment, bidder will be registered as an official plan holder. **Only official plan holders are eligible to bid on the project.** Subcontractors, suppliers, equipment vendors, etc. will also be required to submit the non-refundable payment in order to receive the Proposal Booklet and USB with electronic version of the Contract Documents.

If bidders wish to purchase printed copies of the Contract Documents (beyond the Proposal Booklet), they may be obtained through Avalon. Only official plan holders will be allowed to obtain printed copies of the Contract documents. Bidders acknowledge that they are responsible for review of all components of the Contract Documents. Including all specification sections and drawings, regardless of how many drawings they print and in which format/size they are printed. Full-size drawings are on 30” x 42” paper. Bidders acknowledge they are responsible for properly scaling drawings if they are printed at any other size.

Bids must be submitted upon the proposal form(s) furnished in the Proposal Booklet and must not be detached from the Proposal Booklet. A deposit in the amount of 5% of the base bid will be required and is subject to the conditions provided in the Instruction to Bidders. This deposit shall consist of a bid bond or certified check payable to the COUNTY OF ONEIDA. Failure to submit a bid bond or certified check with bid will result in automatic disqualification of bid. Failure to submit a bid upon the proposal form(s) furnished by the Oneida County Purchasing Department or submittal of form(s) detached from the Proposal Booklet will result in automatic disqualification of bid.

A Performance Bond will be required and for an amount not less than 100% of bid price.

A pre-bid meeting will be held **on site, 121 Second Street, Oriskany, NY on Monday, April 14th, 2025 at 10:30 a.m. in Conference Room B.**

Packages containing bids must be sealed, marked, and addressed to **Oneida County Department of Purchasing, 800 Park Ave, Utica, NY 13501.** Also mark on the envelope or package, the bid reference number and the type of work

for which the proposal is submitted.

The Owner reserves the right to revise or amend the bidding documents prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by addenda to the advertisement. Any inquiries regarding details on specifications must be directed in writing to: Oneida County Department of Public Works, Deputy Commissioner of Engineering, 5999 Judd Road, Oriskany, NY 13424. The owner also reserves the right to waive any irregularity and reject any or all bids received.

The County of Oneida, in order to promote its established Affirmative Action Plan, invites sealed bids from minority groups. This Affirmative Action Policy regarding sealed bids and contracts applies to all persons without regard to race, color, national origin, age, sex, or handicap.

This contract is subject to compliance with Article 8 of the New York State Labor Law regarding prevailing rate of wages. On all public work projects of at least \$250,000.00, all laborers, workers and mechanics working on the site, shall be certified as having successfully completed the OSHA 10-hour construction safety and health course.

No Bidder may withdraw his bid within forty-five (45) days after the date set for the opening thereof.

The Bidding Documents may be examined at the following locations:

Dodge Reports, 231 Salina Meadows, Suite 130, Syracuse, NY 13212

Syracuse Builders Exchange, 6563 Ridings Road, Syracuse, NY 13206

Oneida County Department of Public Works, 5999 Judd Road, Oriskany, NY 13424

Alfred A. Barbato

Director of Purchasing

April 8, 2025

INSTRUCTIONS TO BIDDERS

The following documents are referenced herein or shall be referenced in any contract resulting from this Invitation to Bid. Bidders are encouraged to purchase and review copies of these documents.

1. Instructions to Bidders - AIA Document A701-2018, Modified by Owner
2. Owner-Contractor Agreement – A101-2017, Modified by Owner
3. General Conditions of the Contract - AIA Document A201-2017, Modified by Owner
4. Bid Bond - AIA Document A310
5. Performance Bond and Payment Bond - AIA Document A312

The following documents shall be submitted with the successful Bidder's final payment request:

1. Contractor's Affidavit of Payment of Debts and Claims - AIA Document G706
2. Contractor's Affidavit of Release of Liens - AIA Document G706A
3. Consent of Surety to Final Payment - AIA Document G707
4. Compliance With Labor Rates Declaration (Example on page R-1 of the specifications)
5. Guarantee Declaration (Example on page R-2 of the specifications)

All documents listed above are available for inspection only at the Oneida County Department of Public Works, 5999 Judd Road, Oriskany, New York

 AIA® Document A701® – 2018**Instructions to Bidders**

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

Bid Reference Number 2292
Cornell Cooperative Extension
Addition & Alterations
121 Second Street
Oriskany, New York 13424

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

Oneida County
800 Park Avenue
Utica, NY 13501

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

MARCH Associates, Architects and Planners, P.C.,
258 Genesee Street, Suite 300
Utica, NY 13502

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ADDITIONS AND DELETIONS:

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

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

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

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

ARTICLE 1 DEFINITIONS

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

§ 1.2 Definitions set forth in the General 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 may be viewed and ordered through the Avalon Plan Room website at:

<https://www.avalonsyr-planroom.com/projects/public>

in the "Public Bid" section. Refer to the ADVERTISEMENT – INVITATION TO BID for more information.

§ 3.1.2 A non-refundable deposit of Forty Five Dollars payable to Avalon Document Services will be required to obtain the Proposal Booklet and a USB with an electronic version of the Contract Documents. Refer to the ADVERTISEMENT – INVITATION TO BID for more information.

§ 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 Owner 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.)

Commissioner, Department of Public Works
Oneida County Department of Public Works
5999 Judd Road
Oriskany, NY 13424
publicworks@oneidacountyny.gov

§ 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.)

Email

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

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

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

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

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

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

§ 4.1.6 Paragraph deleted.

§ 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 Bond or Certified Check payable to Oneida County in the amount of five percent (5%) of the base bid.

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall

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

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

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

§ 4.3 Submission of Bids

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

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

Paper copy.

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be attached to the bid documents.

§ 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.)

Bid rank.

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.

§ 6.2 Paragraph Deleted..

§ 6.3 Submittals

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

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

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

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

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

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

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

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

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

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

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

§ 7.2 Time of Delivery and Form of Bonds

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

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

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

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

ARTICLE 8 Paragraph Deleted.

(Table deleted)(Paragraphs deleted)(Paragraphs deleted)

DRAFT AIA® Document A101™ – 2017

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

THIS AGREEMENT, Bid Reference Number 2292 / Contract H _____, made as of the «
» day of «
» in the year «Two Thousand and Twenty Five»
(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status, address and other information)

Oneida County
800 Park Avenue,
Utica, NY 13501

and the Contractor:

(Name, legal status, address and other information)

«TBD»«
»

«
»

«
»

«
»

for the following Project:

(Name, location and detailed description)

Cornell Cooperative Extension
Addition & Alterations
121 Second Street, Oriskany, NY 13424
MARCH No. 23036
Bid Reference Number 2292

The Architect:

(Name, legal status, address and other information)

MARCH Associates, Architects and Planners, P.C.
258 Genesee Street, Suite 300
Utica, 13502

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

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

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

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ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

(Check one of the following boxes.)

[☐] The date of this Agreement.

[☒] A date set forth in a notice to proceed issued by the Owner.

[☐] Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

☐ ☐

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

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

§ 3.3 Substantial Completion

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

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

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

[☒] By the following date: **August 28, 2026**

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

Portion of Work	Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item	Price
Alt. No. 1 – Re-Roof Existing Building	
Alt. No. 2 – Roof Warranty – Existing Building	
Alt. No. 3 – Roof Warranty – Building Addition	
Alt. No. 4 – Rooftop Unit Replacement	
Alt. No. 5 – Communications Conduit	

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

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

Item	Price	Conditions for Acceptance
None		

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price
General Construction Allowance	\$150,000
Plumbing Construction Allowance	\$20,000
Mechanical Construction Allowance	\$40,000
Electrical Construction Allowance	\$50,000
Security Allowance	\$30,000

§ 4.4 Unit prices, if any:

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

Item	Units and Limitations	Price per Unit (\$0.00)
L-1 – Soil Stabilization Fabric	Per Installed Square Yard	
L-2 – Undercutting	Per Install Cubic Yard	
L-3 – 4" Storm Water Management Trench	Per Installed Linear Foot	
L-4 – Medium Duty Asphalt	Per Installed Square Yard	
L-5 – Rock Excavation	Per Removed Cubic Yard	

§ 4.5 Liquidated damages, if any:

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

« »

§ 4.6 Other:

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

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the «Fifteenth » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the «Thirtieth » day of the «following » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than «Ninety » («90 ») days after the Architect receives the Application for Payment.

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

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

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

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

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

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

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

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

§ 5.1.7 Retainage

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

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

«5% »

§ 5.1.7.1.1 The following items are not subject to retainage:

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

« »

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

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

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

(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

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

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

§ 5.2 Final Payment

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

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

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

« »

§ 5.3 Interest

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

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

«Statutory» % «per annum»

§ 5.4 Non-Appropriation Clause

§ 5.4.1 The Owner shall have no liability or obligation under the Contract to the Contractor, or to anyone else, beyond the annual funds appropriate and available thereto.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »

« »

« »

« »

§ 6.2 Binding Dispute Resolution

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

(Check the appropriate box.)

[☐] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[☒] New York State Court of competent jurisdiction sitting in Oneida County, New York or in the United States District Court for the Northern District of New York

[☐] Other *(Specify)*

« »

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

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

« »

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner’s representative:

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

Deputy Commissioner of Engineering
Oneida County Department of Public Works
5999 Judd Road, Oriskany, NY 13424

§ 8.3 The Contractor’s representative:

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

«TBD»

« »

« »

« »

« »

« »

§ 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 Assumption of Risk

§ 8.5.1.1 The Contractor solely assumes the following risks. The risk of unforeseen obstacles and difficulties in the prosecution of the Work covered by the Contract, whether such risks are within or beyond the control of the Contractor and whether such risks involve a legal duty, primary or otherwise, imposed upon the County. The risk of loss or damage, direct or indirect, to any equipment, tools, materials or property furnished, used, installed or received by the County, the Contractor, or any subcontractor, performing services or furnishing materials for the Work covered hereunder.

§ 8.5.1.2 To the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold the County, Architect, and Construction Manager harmless against any and all claims (including but not limited to claims asserted by any employee of the Contractor and/or its subcontractor) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys’ fees and disbursements) allegedly arising out of or in any way related to the risks it assumes under this Section, operations of the Contractor and its subcontractor(s) in the performance of the Contract or from the Contractor’s and/or its subcontractor’s failure to comply with any of the provisions of the Contract or of the law. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article by way of cross-claim, third-party claim, declaratory action, or otherwise.

§ 8.5.1.3 Neither the termination of the Contract nor the making of the final payment shall release the Contractor from its obligations under this Article. The enumeration elsewhere in the Contract of particular risks assumed by the Contractor or of particular claims for which it is responsible shall not be deemed to limit the effect of the provision of this Section or to imply that it assumes or is responsible for only risks or claims of the type enumerated.

§ 8.5.1.4 This assumption of risk by the Contractor is absolute, excepting only reckless or intentional acts of the County, or their officers, agents or employees.

§ 8.5.2 Contractor shall, at its own expense, purchase and maintain insurance of the following types of coverage and limits of liability with an insurance carrier qualified and admitted to do business in the State of New York. The insurance carrier must have at least an A- (excellent) rating by A. M. Best.

§ 8.5.2.1 1.2.1. Commercial General Liability (CGL) coverage with limits of not less than One Million Dollars (\$1,000,000) each occurrence, and Two Million Dollars (\$2,000,000) Annual Aggregate. CGL coverage shall be written on ISO Occurrence form CG 00 01 0413, or a substitute form, providing equivalent coverage and shall cover liability arising from premises, operations, XCU, independent contracts, products, pollution, completed operations, personal and advertising injury. There shall be no exclusions to Contractual Liability for Employee Injuries (i.e. Labor Law Exclusions). The Owner and Architect shall be included as an additional insured, on a on a primary and non-contributing basis before any other insurance or self- insurance, including any deductible or self-insured retention, maintained by, or provided to, the additional insured. The Contactor shall maintain said CGL coverage for itself and the additional insured for the duration of the Contract Period and maintain completed operations coverage for itself and the additional insured for at least three (3) years after completion.

§ 8.5.2.2 Workers' Compensation and Employer's Liability, pursuant to statutory limits.

§ 8.5.2.3 1.2.3. Business Automobile Liability with limits of at least One Million Dollars (\$1,000,000) each accident. Coverage must include liability arising out of all owned, leased, hired, and non-owned automobiles. The Owner and Architect shall be included as an additional insured, on a on a primary and non-contributing basis before any other insurance or self- insurance, including any deductible or self-insured retention, maintained by, or provided to, the additional insured.

§ 8.5.2.4 Excess/Commercial Umbrella coverage with limits of at least Five Million Dollars (\$5,000,000). The Owner and Architect shall be included as an additional insured. Excess/Commercial Umbrella coverage for such additional insured shall apply as primary and non-contributing before any other insurance or self-insurance, including any deductible or self-insured retention, maintained by or provided to the additional insured.

§ 8.5.2.5 Owners and Contractors Protective Liability Insurance in the amount of not less than One Million Dollars (\$1,000,000) per occurrence and One Million Dollars (\$1,000,000) annual aggregate. The Contractor agrees to have this policy in the Owner's name.

§ 8.5.2.6 The Contractor shall purchase and maintain property insurance written on an Installation Floater with "All Risk" or equivalent coverage form in the amount equal or greater than the value of material to be installed included in this contract, plus the value of subsequent contract modifications and cost of materials supplied or installed by others, comprising the total value at the site. Coverage shall be at Replacement Cost and the Contractor will be responsible for any deductibles associated with this coverage. This property insurance shall cover portions of the work stored off the jobsite and also portions of the work in transit

§ 8.5.2.7 The Owner shall not issue a notice to proceed until certificates evidencing the insurance required by this Section has been provided to the Owner. The certificates shall be on forms approved by the Owner, and Contractor where the basis shall contain a provision that coverage afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the Owner. Acceptance of the certificates shall not relieve the Contractor of any of the insurance requirements, nor decrease the liability of the Contractor. The Owner reserves the right to require the Contractor to provide insurance policies for review by the Owner. The Contractor grants the Owner a limited power of attorney to communicate with the Contractor's insurance provider and/or agent for the express purpose of confirming the coverages required hereunder.

§ 8.5.3 The Contractor waives all rights against the Owner and its agents, officers, and employees for recovery of damages to the extent these damages are covered by a policy of insurance maintained per the requirements stated above.

§ 8.5.4 The insurance provisions of Section 8.5 of this Agreement supersede any provisions regarding the same topic stated in any other Contract Document.

§ 8.5.5 A Performance Bond and a Material and Labor Payment Bond shall be submitted by the Contractor. Each bond shall be in the amount of One Hundred Percent (100%) of the amount of the Contract and shall make reference to the Contract. The bonds shall be purchased, at the Contractor's expense, from one or more companies licensed to do business in the State of New York. Said bonds shall not be transferable.

§ 8.5.5.1 The bonds shall be on the form supplied by the County or a form approved by the County. The Contractor shall require the attorney-in-fact that executes the required bonds on behalf of the surety, to affix thereto a certified and current copy of the Power of Attorney. The Contractor shall deliver the required bonds to the County no later than three (3) days following the date this Agreement is executed

§ 8.5.5.2 The Contractor shall deliver the required bonds to the Owner before final execution of this Agreement

§ 8.5.5.3 The Contractor shall require the attorney in fact that executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

§ 8.5.5.4 The Contractor shall purchase and maintain insurance and provide bonds as set forth in the Contract Documents.

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

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

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor as modified by Owner.
- .2 Deleted.
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction as modified by Owner.
- .4 Deleted.

« »

- .5 Drawings

Number

All Sheets

Title

Cornell Cooperative Extension –
Addition & Alteration

Date

March 13, 2025

- .6 Specifications

Section	Title	Date	Pages
All	Specification Book for Bid Reference No. 2292 Cornell Cooperative Extension – Addition & Alteration	March 13, 2025	

.7 Addenda, if any:

Number	Date	Pages
TBD		

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

.8 Other Exhibits:

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

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

« ☐ »

[☐ »] The Sustainability Plan:

Title	Date	Pages

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

Document	Title	Date	Pages
Exhibit A	Addendum – Standard Oneida County Conditions		12

.9 Other documents, if any, listed below:

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

«Proposal Booklet for Bid Reference Number 2292 Signed

ARTICLE 10 INDEMNIFICATION

§ 10.1 The obligations of the Contractor under this section shall survive any expiration or termination of the Contract and shall not be limited by any enumeration herein of required insurance coverage.

§ 10.2 To the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold the Owner, the Architect, their officers, agents and employees (the "Indemnitees"), harmless against any and all claims (including but not limited to claims asserted by any employee of the Contractor and/or its Subcontractors) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the risks it assumes under this Article 10, operations of the Contractor and/or its Subcontractors in the performance of the Contract or from the Contractor's and/or its Subcontractors' failure to comply with any of the provisions of the Contract or of the law. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this paragraph by way of cross-claim, third-party claim, declaratory action or otherwise. The parties

expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of Law or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of Law, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

ARTICLE 11 INDEPENDENT CONTRACTOR STATUS

§ 11.1 For the purposes of this paragraph, the term “Contractor” shall be broadly construed to include the Contractor, and any and all of its Subcontractors, agents, servants, officers, and employees. It is expressly agreed that the relationship of the Contractor to the Owner shall be that of an Independent Contractor. The Contractor shall not be deemed an employee of the Owner for any purpose including, but not limited to, claims for unemployment insurance, workers’ compensation, retirement, or health benefits. The Contractor, as an independent contractor, covenants and agrees that it will conduct itself in accordance with such status, that it will neither hold itself out as, nor claim to be, an officer or employee of the Owner by reason thereof and that it shall not make any claim, demand or application to or for any right or privilege applicable to an officer or employee of the Owner. Both the Owner and the Contractor shall have the right to participate in any conference, discussion or negotiation with any governmental agency regarding the Contractor’s status as an independent contractor.

§ 11.2 The Owner shall not make any withholding for taxes or any other obligations. The Contractor shall be solely responsible for all applicable taxes, payroll deductions, workers’ compensation insurance, and provision of health insurance where required. The Contractor shall indemnify and hold the Owner harmless from all loss or liability incurred by the Owner as a result of the Owner not making such payments or withholdings.

ARTICLE 12 ADVICE OF COUNSEL

§ 12.1 Each party acknowledges that, in executing this Agreement, such party has had the opportunity to seek the advice of independent legal counsel, and has read and understood all of the terms and provisions of the Contract.

ARTICLE 13 AUTHORITY TO ACT/SIGN

§ 13.1 The Contractor’s signatory hereby represents, warrants, personally guarantees and certifies that he has the power and authority to execute and deliver this Agreement and to carry out the obligations hereunder. The execution and delivery by Contractor’s signatory of this Agreement and the consummation of the transactions contemplated herein have been duly authorized by the Contractor; no other action on the part of the Contractor or any other person or entity is necessary to authorize the Contractor’s signatory to enter into the Contract, or to consummate the transactions contemplated herein.

ARTICLE 14 SEVERABILITY

§ 14.1 If any provision of the Contract is or becomes void or unenforceable by force or operation of law, the parties agree that the Contract shall be reformed to replace the stricken provision with a valid and enforceable provision that comes as close as possible to expressing the intention of the parties. Further, the parties agree that all other provisions shall remain valid and enforceable.

ARTICLE 15 COUNTERPARTS

§ 15.1 This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, and all of which together shall be deemed one and the same instrument.

ARTICLE 16 ORDER OF PRECEDENCE

§ 16.1 Conflicts among the Contract Documents shall be resolved in the following order of precedence:

- § 16.1.1 Addendum - Standard Oneida County Conditions
- § 16.1.2 Any Contract Amendments, in reverse chronological order
- § 16.1.3 This Agreement
- § 16.1.4 Addenda to the Specifications
- § 16.1.5 Specifications
- § 16.1.6 Addenda to the Drawings
- § 16.1.7 Drawings
- § 16.1.8 AIA Document A201-2017 as modified
- § 16.1.9 Proposal Book for Bid Reference Number 2292

ARTICLE 17 SUBCONTRACTORS

§ 17.1 Subcontracting by the Contractor without the prior consent of the Owner shall be considered null and void from its inception. The Contractor shall have written agreements with each Subcontractor that requires compliance with the insurance and indemnification provisions stated in this Agreement. A Subcontractor shall maintain policies of insurance identical to that required of the Contractor, and shall assume the same duties and risks undertaken by the Contractor in the Contract. The insurance certificates of the Subcontractor must list the Owner as an additional insured, on a primary, noncontributory basis. No Subcontractor shall perform any portion of the Work until receiving approval by the Owner. The Contractor shall be solely responsible for providing the Work and for complying with the provisions of the Contract, and any Owner- approved subcontracting shall not alter any obligations thereof.

ARTICLE 18 REQUIRED PROVISIONS OF LAW

§ 18.1 In performing the Contract, all applicable governmental laws, regulations, orders, ordinances and other rules of duly constituted authorities will be followed and complied with in all respects by the parties. In particular the Contractor shall fully comply with the following Sections of the Labor Law:

§ 18.1.1 Labor Law Section 220-e relating to Prohibition Against Discrimination and Equal Opportunity.

§ 18.1.2 Prevention of Dust Hazards required by Labor Law Section 222-a.

§ 18.1.3 Labor Law Sections 220 and 220-d, Minimum Wage Rates and Supplements.

§ 18.2 This is a public work contract covered by Article 8 of the Labor Law. Therefore, neither the Contractor's employees nor the employees of its Subcontractors may be required or permitted to work more than the number of hours and days provided in the Labor Law, and as set forth in the prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, the Contractor and its Subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, pursuant to Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by the Owner of any Owner approved sums due and owing for Work done upon the Project. Contractors and Subcontractors performing Work on this project shall comply with all applicable provisions of Article 8 of the Labor Law as amended, of the State of New York.

§ 18.3 Each and every provision of law and clause required by law to be inserted into this Agreement shall be deemed to have been incorporated herein. If any such provision is not inserted through mistake or otherwise, then upon the application of either party, this Agreement shall be amended in writing, and signed by both parties to make such insertion.

[Remainder of page intentionally left blank]

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

OWNER *(Signature)*

«Anthony J. Picente Jr. »
«County Executive »

(Printed name and title)

CONTRACTOR *(Signature)*

«TBD»
« »

(Printed name and title)

FOR
BY
DATE

Protection of Rights

Assumption of Risk, Insurance Requirements, and Bonds

1. Protection of Rights

1.1. Assumption of Risk

- 1.1.1.** The Contractor solely assumes the following risks. The risk of unforeseen obstacles and difficulties in the prosecution of the Work covered by the Contract, whether such risks are within or beyond the control of the Contractor and whether such risks involve a legal duty, primary or otherwise, imposed upon the County. The risk of loss or damage, direct or indirect, to any equipment, tools, materials or property furnished, used, installed or received by the County, the Contractor or any subcontractor, performing services or furnishing materials for the Work covered hereunder.
- 1.1.2.** To the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold the County harmless against any and all claims (including but not limited to claims asserted by any employee of the Contractor and/or its subcontractor) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the risks it assumes under this Section, operations of the Contractor and its subcontractor(s) in the performance of the Contract or from the Contractor's and/or its subcontractor's failure to comply with any of the provisions of the Contract or of the law. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article IV(1)(b) by way of crossclaim, third-party claim, declaratory action or otherwise.
- 1.1.3.** Neither the termination of the Contract nor the making of the final payment shall release the Contractor from its obligations under this Section, entitled Assumption of Risk. The enumeration elsewhere herein of particular risks assumed by the Contractor or of particular claims for which it is responsible shall not be deemed to limit the effect of the provision of this Section or to imply that it assumes or is responsible for only risks or claims of the type enumerated.
- 1.1.4.** This assumption of risk by the Contractor is absolute, excepting only reckless or intentional acts of the County, its officers, agents, or employees.

1.2. Insurance Requirements

1.2.1. The Contractor shall purchase and maintain insurance of the following types of coverage and limits of liability with an insurance carrier qualified and admitted to do business in the State of New York. The insurance carrier must have at least an A- (excellent) rating by A. M. Best.

1.2.1.1. Commercial General Liability (CGL) coverage with limits of not less than One Million Dollars (\$1,000,000) each occurrence, and Two Million Dollars (\$2,000,000) Annual Aggregate. CGL coverage shall be written on ISO Occurrence form CG 00 01 1001, or a substitute form providing equivalent coverage and shall cover liability arising from premises, operations, XCU, independent contracts, products, pollution, completed operations, personal and advertising injury. The County, the County's consultants and sub-consultants shall be included as an additional insured, on a primary and non-contributing basis before any other insurance or self-insurance, including any deductible or self-insured retention, maintained by, or provided to, the additional insured. The Contractor shall maintain said CGL coverage for itself and the additional insured for the duration of the Contract Period and maintain completed operations coverage for itself and the additional insured for at least three (3) years after completion.

1.2.1.2. Workers' Compensation and Employer's Liability, pursuant to statutory limits.

1.2.1.3. Business Automobile Liability with limits of at least One Million Dollars (\$1,000,000) each accident. Coverage must include liability arising out of all owned, leased, hired and non-owned automobiles. The County shall be included as an additional insured on a primary and non-contributing basis.

1.2.1.4. Commercial Umbrella coverage with limits of at least Five Million Dollars (\$5,000,000). The County shall be included as an additional insured. Umbrella coverage for such additional insured shall apply as primary and non-contributing before any other insurance or self-insurance, including any deductible or self-insured retention, maintained by or provided to the additional insured.

1.2.1.5. Owners and Contractors Protective Liability Insurance in the amount of not less than One Million Dollars (\$1,000,000) per occurrence. The Contractor agrees to have this policy in the County's name.

1.2.1.6. Waiver of Subrogation: The Contractor waives all rights against the County, and its agents, officers, and employees for recovery of damages to the extent these damages are covered by insurance maintained per requirements stated above.

1.2.1.7. The County shall not issue a notice to proceed until certificates evidencing the insurance required by this Section have been provided to the County. The certificates shall be on forms approved by the County and shall contain a provision that coverage afforded under the policies will not be cancelled or allowed to expire until at least thirty (30) days prior written notice has been given to the County. Acceptance of the certificates shall not relieve the Contractor of any of the insurance requirements, nor decrease the liability of the Contractor. The County reserves the right to require the Contractor to provide insurance policies for review by the County. The Contractor grants the County a limited power of attorney to communicate with the Contractor's insurance provider and/or agent for the express purpose of confirming the coverages required hereunder.

1.3. Bonds

- 1.3.1.** A Performance Bond and a Material and Labor Payment Bond shall be submitted by the Contractor. Each bond shall be in the amount of One Hundred Percent (100%) of the amount of the Contract and shall make reference to the Contract. The bonds shall be purchased, at the Contractor's expense, from one or more companies licensed to do business in the State of New York. Said bonds shall not be transferable.
- 1.3.2.** The bonds shall be on the form supplied by the County, or a form approved by the County. The Contractor shall require the attorney-in-fact that executes the required bonds on behalf of the surety, to affix thereto a certified and current copy of the Power of Attorney. The Contractor shall deliver the required bonds to the County no later than three (3) days following the date this Agreement is executed.
- 1.3.3.** The County shall be named as beneficiaries on all bonds.

DRAFT AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Oneida County Department of Public Works
Cornell Cooperative Extension
Addition & Alterations
121 Second Street, Oriskany, NY 13424
MARCH No. 23036
Bid Reference No. 2292
General Construction Contract H2456001
Plumbing Construction Contract H2456002
Mechanical Construction Contract H2456003
Electrical Construction Contract H2456004

THE OWNER:

(Name, legal status and address)

Oneida County
800 Park Avenue
Utica, NY 13501

THE ARCHITECT:

(Name, legal status and address)

MARCH Associates Architects and Planners, P.C.
258 Genesee Street, Suite 300
Utica, NY 13502

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11	INSURANCE AND BONDS

ADDITIONS AND DELETIONS:

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 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.

§ 1.5 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 Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 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.

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

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

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

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

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

§ 2.4 Owner's Right to Stop the Work

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

§ 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 prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as

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

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

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

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.4 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.

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

§ 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.

§ 3.5 Warranty

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

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

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.1 The Owner is exempt from the payment of Sales and Compensation Use Taxes of the State of New York and of cities and counties within the State of New York under existing laws. Sales taxes on all materials to be incorporated into the project which are sold to the Owner pursuant to the provisions of the Contract are not to be included in bids. The 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 his 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, and for materials not incorporated into the project.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for all 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. The Owner shall secure and pay for the building permit.

§ 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.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such

notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made 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, 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 of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 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 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.

§ 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 Architect's approval. The Architect'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 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 perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect 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 is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect 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 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 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.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect 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, 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 and the Architect 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.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.1 Submit written report to the Owner of existing damage to roads, walks, lawns, buildings, other property to be affected by the Contract prior to starting work; failure to do so will make the Contractor responsible for all existing damage. The Contractor may request and schedule inspection with the Owner prior to submittal of report. Obtain consent of adjoining property owners regarding temporary easements or any other manner of physical encroachment. At the Owners request, the Contractor shall be required to provide photographs and/or video footage of existing conditions.

§ 3.13.2 No signs or advertising material will be permitted on the job 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 or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 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 may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. 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.

§ 3.18 Section Deleted.

§ 3.19 Substitutions

§ 3.19.1 After the Contract has been executed, the Owner will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the General Requirements.

§ 3.19.2 By making requests for substitutions based on Subparagraph 3.4.4, the Contractor:

§ 3.19.2.1 Represents that the Contractor has personally investigated the proposed substitute product and determined that is equal or superior in all respects to that specified.

§ 3.19.2.2 Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified.

§ 3.19.2.3 Certifies that the cost data presented is complete and includes all related costs under the Contract but excludes costs under separate contracts, and excludes redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent.

§ 3.19.2.4 Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 3.19.3 The Contractor shall be responsible for all additional costs incurred by the Owner as a result of substitution of products whether such costs become apparent at the time of substitution or at a later date. Such costs shall include but not be limited to additional Architectural and/or Consultant fees

ARTICLE 4 ARCHITECT

§ 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 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The 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. The 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.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor 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 Contractor 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 Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 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. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect'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.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect 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 Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect 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 rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or bidding requirements, the Contractor shall within 14 days of Contract execution, furnish in writing to the Owner and Architect the names of persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review or (3) Contractor must provide additional information and that action shall be deferred until the Contractor provides further information. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. Failure to object to a subcontractor or other contract for portions of the work shall not constitute a waiver of any of the requirements of the Contract Documents and all products furnished and services provided must conform to such requirements.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner 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 or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner 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 and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 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 and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect 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, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner 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

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 The allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

§ 7.2.2.1 For the Contractor, for Work performed by the Contractor's own forces, 15 percent of the cost.

§ 7.2.2.2 For the Contractor, for Work performed by the Contractor's Subcontractor, 5 percent of the amount due the Subcontractor.

§ 7.2.2.3 For the Subcontractor, for Work performed by the Subcontractor's own forces, 15 percent of the cost.

§ 7.2.3 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. In no case will a change involving over \$500.00 be approved without itemization.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner 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 Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .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 Architect 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 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 Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 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.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the

Contractor asserts, and the Architect 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 Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.3.4 The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor 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 Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, 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 entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the 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 Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The 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 previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 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 withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 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 Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect 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 Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within forty-five days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner 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 is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 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 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.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect 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.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, 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 receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected

with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the 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 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.

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.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 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 and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect 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 and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 Paragraph Deleted.

§ 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 indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site 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 sole 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. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 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 to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Section Deleted.

§ 11.3 Section Deleted.

§ 11.4 Section Deleted.

§ 11.5 Section Deleted.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the 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 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 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 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 or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the

other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the 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 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 Architect of when and where tests and inspections are to be made so that the 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 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 Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the 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.

§ 13.5 Interest

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, 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.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, 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, 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 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 be certified by the Initial Decision Maker, upon application, 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 Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 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.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, 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.

§ 15.1.4 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 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 after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 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.

§ 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 Section Deleted.

ADDENDUM – STANDARD ONEIDA COUNTY CONDITIONS

The following addendum modifies, changes, or adds to the contract for construction between the County of Oneida, hereinafter known as County, and a Contractor, subcontractor, vendor, vendee, licensor, licensee, lessor, lessee or any third party, hereinafter known as Contractor.

WHEREAS, County and Contractor intend to enter into a contract, license, lease, amendment or other agreement of any kind (hereinafter referred to as the “Contract”), and

WHEREAS, the Oneida County Attorney and the Oneida County Director of Purchasing have recommended the inclusion of the standard clauses set forth in this Addendum to be included in every Contract for which County is a party, now, thereafter,

The parties to any Contract, for good consideration, agree to be bound by the following clauses which will be made a part of the Contract.

1. EXECUTORY OR NON-APPROPRIATION CLAUSE.

a. The County shall have no liability or obligation under this Contract to the Contractor or to anyone else beyond the annual funds being appropriated and available for this Contract.

2. ONEIDA COUNTY BOARD OF LEGISLATORS: RESOLUTION #249 SOLID WASTE DISPOSAL REQUIREMENTS.

a. Pursuant to Oneida County Board of Legislator Resolution No. 249 of May 26, 1999, the Contractor agrees to deliver exclusively to the facilities of the Oneida-Herkimer Solid Waste Authority, all waste and recyclables generated within the Authority’s service area by performance of this Contract by the Contractor and any subcontractors. Upon awarding of this Contract, and before work commences, the Contractor will be required to provide Oneida County with proof that Resolution No. 249 of 1999 has been complied with, and that all wastes and recyclables in the Oneida-Herkimer Solid Waste Authority’s service area which are generated by the Contractor and any subcontractors in performance of this Contract will be delivered exclusively to Oneida-Herkimer Solid Waste Authority facilities.

3. CERTIFICATIONS REGARDING LOBBYING, DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS, AND DRUG-FREE WORKPLACE REQUIREMENTS.

a. Lobbying. As required by Section 1352, Title 31 of the U.S. Code and implemented at 34 CFR Part 82 for persons entering into a grant or cooperative agreement over \$100,000, as defined at 34 CFR Part 82, Section 82.105 and 82.110, the Contractor certifies that:

i. No federal appropriated funds have been paid or will be paid, by or on behalf of the Contractor, to any persons for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of

Congress in connection with the making of any federal grant, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal grant or cooperative agreement.

ii. If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federal grant or cooperative agreement, the Contractor shall complete and submit Standard Form 111 "Disclosure Form to Report Lobbying," in accordance with its instructions.

iii. The Contractor shall require that the language of this certification be included in the award documents for all subcontracts and that all subcontractors shall certify and disclose accordingly.

b. Debarment, Suspension and other Responsibility Matters. As required by Executive Order 12549, Debarments and Suspension, and implemented at 34 CFR Part 85, for prospective participants in primary covered transactions, as defined at 34 CFR Part 85, Sections 83.105 and 85.110,

i. The Contractor certifies that it and its principals:

A. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;

B. Have not within a three-year period preceding this Contract been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or contract under a public transaction, violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

C. Are not presently indicted or otherwise criminally or civilly charged by a Government entity (federal, state or local) with commission of any of the offenses enumerated in subparagraph (B), above, of this certification; and

D. Have not within a three-year period preceding this Contract had one or more public transactions (federal, state, or local) for cause or default;

ii. Where the Contractor is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this Contract.

c. Drug-Free Workplace (Contractors other than individuals). As required by the Drug-Free Workplace Act of 1988, and implemented at 34 CFR Part 85, Subpart F, for Contractors, as defined at 34 CFR Part 85, Sections 85.605 and 85.610:

i. The Contractor will or will continue to provide a drug-free workplace by:

A. Publishing a statement notifying employees that the manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

B. Establishing an ongoing drug-free awareness program to inform employees about:

1) The dangers of drug abuse in the workplace;

2) The Contractor's policy of maintaining a drug-free workplace;

3) Any available drug counseling, rehabilitation, and employee assistance program; and

4) The penalties that may be imposed upon an employee for drug abuse violation occurring in the workplace;

C. Making it a requirement that each employee to be engaged in the performance of the Contract be given a copy of the statement required by paragraph (A), above;

D. Notifying the employee in the statement required by paragraph (A), above, that as a condition of employment under the Contract, the employee will:

1) Abide by the terms of the statement; and

2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five (5) calendar days after such conviction;

E. Notifying the County, in writing within ten (10) calendar days after having received notice under subparagraph (D)(2), above, from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position and title, to:

1) Director, Grants Management Bureau, State Office Building Campus, Albany, New York 12240. Notice shall include the identification number(s) of each affected contract.

F. Taking one of the following actions, within thirty (30) calendar days of receiving notice under paragraph (D)(2), above, with respect to any employee who is so convicted;

1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state or local health, law enforcement, or other appropriate agency;

G. Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (A),(B),(C),(D),(E) and (F), above.

ii. The Contractor may insert in the space provided below the site(s) for the performance of work done in connection with the specific contract.

Place of Performance (street, address, city, county, state, zip code)

d. Drug-Free Workplace (Contractors who are individuals). As required by the Drug-Free Workplace act of 1988, and implemented at 34 CFR Part 85, Subpart F, for Contractors that are individuals, as defined at 34 CFR Part 85, Sections 85.605 and 85.610:’

i. As a condition of the contract, the Contractor certifies that he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the Contract; and

ii. If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any contract activity, the Contractor will report the conviction, in writing, within ten (10) calendar days of the conviction, to:

A. Director, Grants Management Bureau, State Office Building Campus, Albany, NY 12240.

Notice shall include the identification number(s) of each affected Contract.

4. HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA). When applicable to the services provided pursuant to the Contract:

a. The Contractor, as a Business Associate of the County, shall comply with the Health Insurance Portability and Accountability Act of 1996, hereinafter referred to as “HIPAA,” as well as all regulations promulgated by the Federal Government in furtherance thereof, to assure the privacy and security of all protected health information exchanged between the Contractor and the County. In order to assure such privacy and security, the Contractor agrees to enact the following safeguards for protected health information:

i. Establish policies and procedures, in written or electronic form, that are reasonably designed, taking into consideration the size of, and the type of activities undertaken by, the Contractor,

to comply with the Standards for Privacy of Individual Identifiable Health Information, commonly referred to as the Privacy Rule;

ii. Utilize a combination of electronic hardware and computer software in order to securely store, maintain, transmit, and access, protected health information electronically; and

iii. Utilize an adequate amount of physical hardware, including but not limited to, locking filing cabinets, locks on drawers, other cabinets and office doors, in order to prevent unwarranted and illegal access to computers and paper files that contain protected health information of the County's clients.

b. This agreement does not authorize the Contractor to use or further disclose the protected health information that the Contractor handles in treating patients of the County in any manner that would violate the requirements of 45 CFR § 164.504(e), if that same use or disclosure were done by the County, except that:

i. The Contractor may use and disclose protected health information for the Contractor's own proper management and administration; and

ii. The Contractor may provide data aggregation services relating to the health care operations of the County.

c. The Contractor shall:

i. Not use or further disclose protected health information other than as permitted or required by this contract or as required by law;

ii. Use appropriate safeguards to prevent the use or disclosure of protected health information other than as provided for in this Contract;

iii. Report to the County any use or disclosure of the information not provided for by this Contract of which the Contractor becomes aware;

iv. Ensure that any agents, including a subcontractor, to whom the Contractor provides protected health information received from, or created or received by the Contractor on behalf of the County, agrees to the same restrictions and conditions that apply to the Contractor with respect to such protected health information;

v. Make available protected health information in accordance with 45 CFR §164.524;

vi. Make available protected health information for amendment and incorporate any amendments to protected health information in accordance with 45 CFR §164.528;

vii. Make available the information required to provide an accounting of disclosures in accordance with 45 CFR § 164.528;

viii. Make its internal practices, books, and records relating to the use and disclosure of protected health information received from, or created or received by, the Contractor on behalf of the County available to the Secretary of Health and Human Services for purposes of determining the County's compliance with 45 CFR § 164.504(e)(2)(ii); and

ix. At the termination of this Contract, if feasible, return or destroy all protected health information received from, or created or received by, the Contractor on behalf of the County that the Contractor still maintains, in any form, and retain no copies of such information; or, if such return or destruction is not feasible, extend the protections of this Contract permanently to such information and limit further uses and disclosures to those purposes that make the return or destruction of the information infeasible.

d. The Contractor agrees that this contract may be amended if any of the following events occurs:

i. HIPAA, or any of the regulations promulgated in furtherance thereof, is modified by Congress or the Department of Health and Human Services;

ii. HIPAA, or any of the regulations promulgated in furtherance thereof, is interpreted by a court in a manner impacting the County's HIPAA compliance; or

iii. There is a material change in the business practices and procedures of the County.

e. Pursuant to 45 CFR § 164.504(e)(2)(iii), the County is authorized to unilaterally terminate this Contract if the County determines that the Contractor has violated a material term of this Contract.

5. NON-ASSIGNMENT CLAUSE. In accordance with Section 109 of the General Municipal Law, this Contract may not be assigned by the Contractor or its right, title or interest therein assigned, transferred, conveyed, sublet or otherwise disposed of without the County's previous written consent, and any attempts to do so are null and void. The Contractor may, however, assign its right to receive payments without the County's prior written consent unless this Contract concerns Certificates of Participation pursuant to Section 109-b of the General Municipal Law.

6. WORKER'S COMPENSATION BENEFITS In accordance with Section 108 of the General Municipal Law, this Contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this Contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

7. NON-DISCRIMINATION REQUIREMENTS. To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other state and federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin, sexual orientation, age, disability, genetic predisposition or carrier status, or marital status. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a Contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this Contract shall be performed within the State of New York, the Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this Contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 of the Labor Law, the Contractor agrees that neither it nor its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this Contract. The Contractor is subject to fines of \$50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this Contract and forfeiture of all monies due hereunder for a second or subsequent violation.

8. WAGE AND HOURS PROVISIONS. If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 of the Labor Law, neither the Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said Articles, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, the Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by the County of any County-approved sums due and owing for work done upon the project.

9. NON-COLLUSIVE BIDDING CERTIFICATION. In accordance with Section 103-d of the General Municipal Law, if this Contract is awarded based upon the submission of bids, the Contractor certifies and affirms, under penalty of perjury, as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (1) the prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; and (2) unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (3) no attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition. The Contractor further affirms that, at the time the Contractor submitted its bid, an authorized and responsible person executed and delivered to the County a non-collusive bidding certification on the Contractor's behalf.

10. RECORDS. The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertaining to performance under this Contract (hereinafter, collectively, "the Records"). The Records shall include, but not be limited to, reports, statements, examinations, letters, memoranda, opinions, folders, files, books, manuals, pamphlets, forms, papers, designs, drawings, maps, photos, letters, microfilms, computer tapes or discs, electronic files, e-mails (and all attachments thereto), rules, regulations and codes. The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The County Comptroller, the County Attorney and any other person or entity authorized to conduct an audit or examination, as well as the agency or agencies involved in this Contract, shall have access to the Records during normal business hours at an office of the Contractor within the County or, if no such office is available, at a mutually agreeable and reasonable venue within the County, for the term specified above, for the purposes of inspection, auditing and copying. The County shall take reasonable steps to protect from public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law (the "Statute"), provided that: (a) the Contractor shall timely inform an appropriate County official, in writing, that said records should not be disclosed; (b) said records shall be sufficiently identified; and (c) in the sole discretion of the County, designation of said records as exempt under the Statute is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, the County's right to discovery in any pending or future litigation. Notwithstanding any other language, the Records may be

subject to disclosure under the New York Freedom of Information Law, for other applicable state or federal law, rule or regulation.

11. IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION.

a. Identification Number(s). Every invoice or claim for payment submitted to a County agency by a payee, for payment for the sale of goods or service or for transactions (e.g., leases, easements, licenses, etc.) related to real or personal property must include the payee's identification number. This number includes any or all of the following: (i) the payee's Federal employer identification number, (ii) the payee's Federal social security number, and/or (iii) the payee's Vendor Identification Number assigned by the Statewide Financial System. Where the payee does not have such number or numbers, the payee, on its invoice or claim for payment, must state with specificity the reason or reasons why the payee does not have such number or numbers.

b. Privacy Notification. (i) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to the County is mandatory. The principle purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their liabilities and to generally identify persons affected by the taxes administered by the New York State Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (ii) The personal information is requested by the County's purchasing unit contracting to purchase goods or services or lease the real or personal property covered by this Contract.

12. CONFLICTING TERMS. In the event of a conflict between the terms of the Contract (including any and all attachments thereto and amendments thereof) and the terms of this Addendum, the terms of this Addendum shall control.

13. GOVERNING LAW. This Contract shall be governed by the laws of the State of New York except where the Federal Supremacy Clause requires otherwise.

14. PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS.

a. The Contractor certifies and warrants that all wood products to be used under this Contract award will be acquired in accordance with, but not limited to, the specifications and provisions of Section 165 of the State Finance Law (Use of Tropical Hardwoods), which prohibits purchase and use of tropical hardwoods, unless specifically exempted by the State or any governmental agency or political

subdivision or public benefit corporation. Qualification for an exemption under this law will be the sole responsibility of the Contractor to establish to meet with the approval of the County.

b. In addition, when any portion of this Contract involving the use of woods, whether for supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in Section 165 of the State Finance Law. Any such use must meet with approval of the County; otherwise, the bid may not be considered responsive. Under bidder certifications, proof of qualification for exemption will be the sole responsibility of the Contractor to establish to meet with the approval of the County.

15. COMPLIANCE WITH NEW YORK STATE INFORMATION SECURITY BREACH AND NOTIFICATION ACT. The Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa).

16. GRATUITIES AND KICKBACKS.

a. Gratuities. It shall be unethical for any person to offer, give, or agree to give any County employee or former County employee, or for any County employee or former County employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, or preparation of any part of a program requirement or a purchase request; influencing the content of any specification or procurement standard; rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application; request for ruling, determination, claim, or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefor.

b. Kickbacks. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime Contractor or higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

17. AUDIT.

a. The County, the State of New York, and the United States shall have the right at any time during the term of this agreement and for the period limited by the applicable statute of limitations to audit the payment of monies hereunder. The Contractor shall comply with any demands made by the County to provide information with respect to the payment of monies made hereunder during the period covered by this paragraph. The Contractor shall maintain its books and records in accordance with

generally accepted accounting principles or such other method of account which is approved in writing by the County prior to the date of this agreement. The revenues and expenditures of the Contractor in connection with this agreement shall be separately identifiable. Each expenditure or claim for payment shall be fully documented. Expenditures or claims for payment which are not fully documented may be disallowed. The Contractor agrees to provide to, or permit the County to examine or obtain copies of, any documents relating to the payment of money to the Contractor or expenditures made by the Contractor for which reimbursement is requested to be made or has been made to the Contractor by the County. The Contractor shall maintain all records required by this paragraph for 7 years after the date this agreement is terminated or ends.

b. If the Contractor has expended, in any fiscal year, \$300,000.00 or more in funds provided by a federal financial assistance program from a federal agency pursuant to this agreement and all other contracts with the County, the Contractor shall provide the County with an audit prepared by an independent auditor in accordance with the Single Audit Act of 1984, 31 U.S.C. §§ 7501, et seq., as amended, and the regulations adopted pursuant to such Act.

18. CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT.

a. Pursuant to Section 103-g of the General Municipal Law, by submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, each bidder or Contractor, or any person signing on behalf of any bidder or Contractor, and any assignee or subcontractor and, in the case of a joint bid, each party thereto, certifies, under penalty of perjury, that once the Prohibited Entities List is posted on the Office of General Services (hereinafter "OGS") website, that to the best of its knowledge and belief, that each bidder or Contractor and any subcontractor or assignee is not identified on the Prohibited Entities List created pursuant to State Finance Law § 165-a(3)(b).

b. Additionally, the bidder or Contractor is advised that once the Prohibited Entities List is posted on the OGS website, any bidder or Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to this solicitation must certify at the time the Contract is renewed, extended or assigned that it is not included on the Prohibited Entities List.

c. During the term of the Contract, should the County receive information that a bidder or Contractor is in violation of the above-referenced certification, the County will offer the person or entity an opportunity to respond. If the person or entity fails to demonstrate that he, she or it has ceased engagement in the investment which is in violation of the Iran Divestment Act of 2012 within ninety

(90) days after the determination of such violation, then the County shall take such action as may be appropriate, including, but not limited to, imposing sanctions, seeking compliance, recovering damages or declaring the bidder or Contractor in default,

d. The County reserves the right to reject any bid or request for assignment for a bidder or Contractor that appears on the Prohibited Entities List prior to the award of a Contract and to pursue a responsibility review with respect to any bidder or Contractor that is awarded a Contract and subsequently appears on the Prohibited Entities List.

19. PROHIBITION ON TOBACCO AND E-CIGARETTE USE ON COUNTY PROPERTY

a. Pursuant to Local Law No. 3 of 2016, the use of tobacco and e-cigarettes are prohibited on Oneida County property, as follows:

i. For the purposes of this provision, the “use of tobacco” shall include:

A. The burning of a lighted cigarette, pipe, cigar or other lighted instrument for the purpose of smoking tobacco or a tobacco substitute;

B. The use of tobacco and/or a substance containing tobacco or a tobacco substitute by means other than smoking, including: chewing; holding in the mouth; or expectoration of chewing tobacco.

ii. For the purposes of this provision, “e-cigarette” shall mean an electronic device composed of a mouthpiece, heating element, battery and electronic circuit that delivers vapor which is inhaled by an individual user as he or she simulates smoking.

iii. For the purposes of this provision, “on Oneida County property” shall be defined as:

A. Upon all real property owned or leased by the County of Oneida; and

B. Within all County of Oneida-owned vehicles or within private vehicles when being used for a County of Oneida purpose, except that a driver may smoke in a privately-owned vehicle being used for a County of Oneida Purpose if the driver is the sole occupant of the vehicle.

iv. Each violation of this Local Law No. 3 of 2016 shall constitute a separate and distinct offense and may be punishable by a fine of up to \$200.00 for a first offense and up to \$1,000.00 for subsequent offenses.

20. COMPLIANCE WITH NEW YORK STATE LABOR LAW § 201-G

a. The Contractor shall comply with the provisions of New York State Labor Law § 201-g.

(EXAMPLE FORMAT - Submit on contractor's letterhead.)

COMPLIANCE WITH LABOR RATES

State of New York)

County of Oneida)

(NAME) , being duly sworn, deposed and says that I am the (TITLE) of (COMPANY NAME), and I make this affidavit in order to induce Oneida County to make final payment to (COMPANY NAME) under the contract between (COMPANY NAME) and Oneida County for (DESCRIPTION OF WORK) work performed for County Contract No. (HXXXXXXXX), (PROJECT NAME), County of Oneida, State of New York.

That all men employed by (COMPANY NAME), have been fully paid, and that all labor, tax assessments and levies applicable to the labor performed by (COMPANY NAME), have been fully paid, and there are no outstanding bills or claims of any nature whatsoever against (COMPANY NAME), arising out of labor performed under the aforesaid contract with Oneida County.

That the same Company has complied with or exceeded the minimum hourly rates as determined by the Department of Labor for persons employed on the aforesaid contract with Oneida County.

That the final payment in the sum of \$(FINAL PAYMENT AMOUNT) from Oneida County hereby releases and forever discharges Oneida County from any claim of any nature whatsoever arising out of the aforesaid contract.

(S)

(Name)

(Title)

Sworn to before me this ____ day of _____, 20____.

Notary Public

(EXAMPLE FORMAT - Submit on contractor's letterhead.)

GUARANTEE

(Date)

Oneida County Department of Public Works
Division of Engineering
5999 Judd Road
Oriskany, New York 13424

Re: County Contract No. (HXXXXXXXX)
(DESCRIPTION OF CONTRACT)

Gentlemen:

In accordance with your request, we quote our guarantee:

(COMPANY NAME) GUARANTEES that the material and workmanship of the apparatus, and all the items installed by them in the above project, are first class in every respect and in accordance with the drawings and specifications and (COMPANY NAME) WILL make good any defects not due to ordinary wear and tear and improper use which may develop within one (1) year from (DATE AGREED UPON BY COUNTY AND COMPANY).

(S)

(Name)

(Title)

NEW YORK STATE WAGE RATES

The Contractor shall ensure that workers are paid the appropriate wages and supplemental (fringe) benefits. Throughout the contract, the Contractor shall obtain and pay workers in accordance with periodic wage rate schedule updates from the NYS Department of Labor (NYSDOL). Wage rate amendments and supplements are available on the NYSDOL web site at <https://labor.ny.gov/workerprotection/publicwork/OWSaccess.shtm>. All changes or clarification of labor classification(s) and applicability of prevailing wage rates shall be obtained in writing from the Office of the Director, NYSDOL Bureau of Public Work.

The NYSDOL prevailing wage rate schedule for this contract has been determined and is available on the internet. The prevailing wage rate schedule is accessed by visiting the NYSDOL website, navigating to the appropriate web page, and entering the Prevailing Rate Case No. (PRC#) **2024015492**.

SEALS PAGE

ONEIDA COUNTY DEPARTMENT OF PUBLIC WORKS

**CORNELL COOPERATIVE EXTENSION
ADDITION & ALTERATIONS
121 SECOND STREET, ORISKANY, NY 13424**

I hereby certify that the plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Architect or Licensed Professional Engineer under the Laws of the State of New York.

ARCHITECT:

MARCH Associates Architects & Planners, PC
David D. Jadowski
NYS License No.: 036964-01
Valid through: 02/28/2026

**STRUCTURAL ENGINEER:**

Interactive Engineering Solutions
Douglas R. Cahill
NYS License No.: 061675
Valid through: 03/31/2026
Certificate No.: 0022543, exp. 11/30/27

**M/E/P ENGINEER:**

Towne Engineering
William H. Towne
NYS License No.: 045860
Valid through: 08/31/2027
Certificate No.: 101084, exp. 1/31/25



LANDSCAPE ARCHITECT:

Appel Osborne Landscape Architecture
Vincent P. Pietrzak
NYS License No.: 001287-01
Valid through: 08/31/2026



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SECTION 00 01 15

LIST OF DRAWING SHEETS

The following Drawings accompany this Project Manual and are a part thereof. Drawings are the property of the Architect or Engineer and shall not be used for any other purpose other than contemplated by the Drawings and Project Manual.

DRAWING NO. TITLE

CODE COMPLIANCE

CC101	CODE COMPLIANCE PLAN
CC102	CODE COMPLIANCE PLANS

SITEWORK

L100	SURVEY
L101	SITE PREPARATION PLAN
L102	STORM WATER POLLUTION PREVENTION PLAN
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L104	GRADING DRAINAGE & UTILITY PLAN
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S101	BASEMENT FOUNDATION PLAN
S201	FIRST FLR FRAMING & FOUNDATION PLAN
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S401	TYPICAL FOUNDATION DETAILS
S402	FOUNDATION SECTIONS AND DETAILS
S403	FOUNDATION SECTIONS & DETAILS
S404	FOUNDATION SECTIONS & DETAILS
S405	FOUNDATION SECTIONS & DETAILS
S501	CFMF DETAILS AND NOTES
S601	TYPICAL FRAMING DETAILS
S602	FIRST FLOOR FRAMING SECTIONS
S603	MOMENT CONNECTION DETAILS
S604	ROOF FRAMING SECTIONS
S605	ROOF FRAMING SECTIONS
S701	DESIGN PARAMETERS, GENERAL NOTES & LINTEL SCHEDULE
S801	COLUMN SCHEDULE AND BASE PLATE DETAILS
S802	COLUMN BASE PLATE DETAILS

ARCHITECTURAL

AD101	REMOVALS PLAN
A101	BASEMENT FLOOR PLAN
A102	FIRST FLOOR PLAN
A111	REFLECTED CEILING PLAN
A201	BUILDING ELEVATIONS
A301	BUILDING SECTIONS
A302	WALL SECTIONS
A303	WALL SECTIONS
A401	ENLARGED PLANS & DETAILS
A402	ENLARGED PLANS & DETAILS
A403	STAIR PLANS, SECTIONS & DETAILS
A404	INTERIOR ELEVATIONS
A601	DOOR & WINDOW TYPES & DETAILS

A602	ROOM FINISH SCHEDULE & DETAILS
A603	CURTAIN WALL ELEVATIONS
A701	ROOF PLAN
A702	ROOF DETAILS
FE101	FURNITURE PLAN

PLUMBING

PD101	FIRST FLOOR REMOVALS PLAN
P101	BASEMENT FLOOR PLAN
P102	FIRST FLOOR PLAN
P103	ROOF PLAN
P601	DETAILS
P602	DETAILS

MECHANICAL

MD101	ROOF AND FIRST FLOOR REMOVALS PLANS
M101	BASEMENT FLOOR PLAN
M102	FIRST FLOOR PLAN (PIPING)
M103	FIRST FLOOR PLAN (DUCTWORK)
M104	ROOF PLAN
M601	DETAILS
M602	SCHEDULES
M603	SCHEMATICS

ELECTRICAL

ME100	MOTOR STARTER SCHEDULE
E001	SITE PLAN
ED101	FIRST FLOOR REMOVALS PLAN
E101	FIRST FLOOR PLAN (LIGHTING)
E102	FIRST FLOOR PLAN (POWER)
E103	FIRST FLOOR PLAN (MISC.)
E104	FIRST FLOOR PLAN (MECH. EQUIP.)
E105	BASEMENT FLOOR PLAN – LIGHTING
E106	BASEMENT FLOOR PLAN POWER & MISC.
E107	ROOF PLAN
E600	ONE LINE POWER DIAGRAMS
E601	ONE LINE POWER DIAGRAMS – ALT. NO. 4
E700	DETAILS
E701	DETAILS
E702	DETAILS
E703	DETAILS

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Supply all labor, materials, equipment, appliances and incidentals required and necessary for layout, installing and performing the work associated with the General, Plumbing, Mechanical and Electrical construction contracts at the Cornell Cooperative Extension Building at 121 Second Street, Oriskany, NY as shown on the Contract Drawings and described in the Contract Specifications.

1.02 ASBESTOS

- A. Only non-asbestos products shall be installed on this project.
- B. Information about materials containing asbestos shall be immediately brought to the attention, in writing, of the Owner.
- C. All Contractors shall furnish a letter at project completion stating that No Asbestos Materials were utilized in the construction.
- D. Existing materials identified to be impacted as part of the construction have been tested for the presence of asbestos. No asbestos containing materials were found. A report documenting these findings may be obtained from the County.

1.03 SCHEDULE

- A. Begin work immediately after contracts have been fully executed.
 - 1. Submit Certificates of Insurance to the County immediately.
- B. Schedule Requirements:
 - 1. All work must be scheduled and coordinated with the Owner.
 - a. All work under this Contract is to be performed during normal working business hours. Work may also be performed on Saturday's or Sunday's, if requested no later than the preceding Wednesday. All work is to be coordinated with the Owner.
- C. The following milestone dates shall serve as the basis for bidding. A master schedule will be developed at a general meeting with the Owner and Architect within 10 days of award. This master schedule will incorporate the milestones listed below:
 - 1. Award contracts on or about **May 7, 2025.**
 - 2. Complete all submittals (45) days after award.
 - 3. Construction can begin immediately upon proof of insurance.
 - a. Addition shall be weathertight by **November 1, 2025.**
 - b. Pavement subbase shall be completed by **November 14, 2025.**
 - c. Existing men's toilet room will not be taken off-line until Rooms 20 & 23 are complete.
 - 4. **Project will be substantially complete by August 28, 2026.**
- D. All work is to be coordinated with the County.

1.04 CONTRACT

- A. Perform the Work under lump sum contracts with the Owner.
- B. GENERAL CONSTRUCTION
 - 1. Perform Work required and as specified in the following Specification Sections and Divisions: Division 1 through 12 and 31 through 33.
 - 2. Perform Work required and indicated on the following Drawings:
 - a. All "CC", "L", "S", "AD" and "A" Series Drawings.
- C. PLUMBING CONSTRUCTION
 - 1. Perform Work required and as specified in the following Specification Sections and Divisions: Division 1 and 22, as well as Section 06 10 00, 07 05 53, 07 84 00, 07 92 00, 08 31 00 and 09 91 23, as they apply to this Plumbing Contract.
 - 2. Perform Work required and indicated on the following Drawings:
 - a. All "CC", "PD" and "P" Series Drawings.
- D. MECHANICAL CONSTRUCTION
 - 1. Perform Work required and as specified in the following Specification Sections and Divisions: Division 1 and 23, as well as Sections 06 10 00, 07 05 53, 07 84 00, 07 92 00, 08 31 00 and 09 91 23, as they apply to this Mechanical Contract.
 - 2. Perform Work required and indicated on the following Drawings:
 - a. All "CC", "MD" and "M" Series Drawings.
- E. ELECTRICAL CONSTRUCTION
 - 1. Perform Work required and as specified in the following Specification Sections and Divisions: Divisions 1, 26, 27 and 28, as well as Section 06 10 00, 07 05 53, 07 84 00, 07 92 00, 08 31 00, and 09 91 23, as they apply to this Electrical Contract.
 - 2. Perform Work required and indicated on the following Drawings:
 - a. All "CC", "ED" and "E" Series Drawings.
- F. The above listing of drawings and specifications by type of Contractor is intended as a guide and does not relieve the Contractors of the responsibility of reviewing all drawings and specifications for bidding and coordinating with each other during the construction period. Review Contract Documents before submitted proposals.

1.05 WORK SEQUENCE

- A. Work in stages to accommodate the Owner's use of the premises during the construction period. Coordinate construction schedule, including start dates, with the Owner.
 - 1. All work to be performed during normal business hours.

1.06 CONTINUOUS OWNER OCCUPANCY

- A. The Owner will occupy the existing building during the construction period and will maintain normal operations until the time comes when utility shut downs will be required. The Owner will cooperate with the Contractor to facilitate the continuity and the progress of the Work. Cooperate with the Owner by minimizing the disturbance of the Owner's activities in spaces adjacent to the construction work.

- B. Protect the occupants and the general public at street level against hazards of the construction operation and also provide access to Owner-occupied spaces. If elimination of access to any occupied space becomes necessary, it shall occur only after advance notice and special arrangements with the Owner.
- C. Provide necessary barricades, temporary partitions, other separations, and closures to protect the occupants of the building from harm or injury due to the construction operations, to restrict occupancy of construction areas to construction workers, and to prevent dust and debris caused by construction activities from entering Owner-occupied spaces.
- D. Maintain exitways at all times while the building is occupied.

1.07 CONTRACTOR'S USE OF PREMISES

- A. Use of the Sites and Buildings: Limit use of the premises to work in the areas indicated. Confine operations to areas within contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
- B. Driveways and entrances: Do not use drives and roads outside Contract Limit Lines for parking or storage of materials. Schedule deliveries to minimize use of drives and roads adjacent to the Project Site. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site. Keep driveways and entrances serving the premises clear at all times; do not use these areas for parking or storage of materials. Designated parking areas will be made available at the site.
- C. Keep existing parking lots, driveways and roads (Second Street and Judd Road) free of construction debris and mud. Clean and or sweep areas when necessary or as directed by the Owner.
- D. Use of the Existing Buildings: Maintain the existing buildings in a weather tight condition throughout the construction period. Repair damage caused by construction operations at once.

1.08 SPECIAL PROJECT CONDITIONS

- A. The Owner's forces will move all loose furnishings and equipment from the areas where construction will be performed prior to the commencement of the work. These items will be stored out of the work area.
- B. All contracts include General Conditions, Supplementary Conditions and General Requirements Sections.
- C. Contractor is responsible for providing dumpsters for job related materials only. Locate as directed by the Owner's Representative. Hazardous materials, concrete/masonry rubble, etc., to be legally disposed of by appropriate contractor.
- D. Contractor is responsible for obtaining craft-specific and off-site permits as may be required to perform his work.

1.09 SPECIAL CONSIDERATIONS DURING CONSTRUCTION

- A. Maintain Material Safety Data Sheets on site available for review by responsible individuals. Schedule work as required so that substantial completion of the project occurs a minimum of 48 hours or the manufacturers recommended time for "baking out" and exhausting of volatile organic compounds used in construction prior to building occupancy by the Owner.

1.10 WORK INCLUDED IN ALL BID PACKAGES

- A. Any and all surveys, layouts, etc. required to accomplish the work is to be provided by the CONTRACTOR. Owner will provide coordinated bench marks and coordinates for all trades but it is a specific requirement that the CONTRACTOR provide their own layouts, surveys, etc. from these points.
- B. CONTRACTOR will be responsible to provide drinking water for his own personnel.
- C. CONTRACTOR is expected to review all the plans and specifications as it may affect their work and/or trade jurisdiction and to include in their proposal all costs necessary to make connections with or coordinate with those requirements whether expressly stated therein or implied. This is to include but not limited to tie-ins to existing construction, field control wiring, etc. where normally claimed by trade jurisdiction of the CONTRACTOR.
- D. Unless otherwise stated in individual scopes of work, all sleeves and other embedded items are to be furnished and installed by the CONTRACTOR requiring same. This is to include any cutting and patching. Cutting is to be done neatly with minimal damage to surrounding materials, and holes to be patched and/or fire safed as required to the satisfaction of the Owner and Architect. Architectural finishes to be completed by the trade contractor.
- E. Unless otherwise included in their scopes of work, demolition, removal and/or relocation of any existing items shown on the drawings that conflicts with the installation of the new work is the responsibility of the CONTRACTOR installing the new work.
- F. CONTRACTOR shall restore all lawn and planting areas disrupted in the performance of their work.
- G. CONTRACTOR is responsible to clean up after himself and remove his debris to his own dumpster located as directed by the Owner's Representative. If an area is left uncleaned, the contractor responsible for the debris will be notified to clean it up by a specified time or have it done by others to his account. Trash that is not readily identifiable, such as coffee cups, etc., will be the responsibility of the contractors that have been eating or working in the area and cleanup costs will be distributed among them.
- H. CONTRACTOR is responsible for utility costs and hook-ups to their trailers, etc.
- I. Contractor shall provide sealants to complete the work of their Contract and maintain the building weathertight.
- J. Access panels and access doors shall be furnished by the Contractor requiring access for their scope of work. The Contractor shall coordinate the location of the access point with the Owner and Architect.

1.11 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. The lists of equipment, tabulations of data and schedules appearing in the specifications or drawings are included only for the assistance and guidance of the Contractor in arriving at a more complete understanding of the intended installation. They are not intended, or to be construed, as relieving the responsibility of the Contractors in making their own takeoffs.

1.12 OBSTACLES AND MINOR ADJUSTMENTS

- A. The drawings are not intended to show all details relating to exact positioning and alignment of furnishings. The Contractor will be required to make such changes in location of furnishings as may be needed to accommodate the Work to obstacles

encountered. Minor changes due to field condition, or at the request of the Owner, shall be made by the Contractors at no expense to the Owner.

1.13 ABBREVIATIONS AND SYMBOLS

- A. Contractors are expected to be familiar with the standard abbreviation symbols used in the Contract Documents. Inform the Architect, in writing, of any unclear or unknown abbreviation or symbol prior to the Bid Date. Unless notified, the Architect will assume that the Contractors are fully familiar with all such items and can execute their Work accordingly.

1.14 PROTECTION OF EXISTING BUILDING AND GROUNDS

- A. Provide protection to prevent damage to building, both interior and exterior, during construction operations.
- B. Repair damage to building and grounds to satisfaction of the Owner during the course of the project.

1.15 PROTECTION OF EQUIPMENT AND MATERIALS

- A. The Contractor shall assume full and complete responsibility for protection and safekeeping of his products and equipment stored at project location.

1.16 PROTECTION OF UTILITIES AND PAVING

- A. Provide and maintain adequate protection for existing utilities. Repair such Work damaged during construction to the satisfaction of the Architect.

1.17 WORKERS CONDUCT

- A. No smoking is allowed in buildings or on the property. No drinking of alcoholic beverages or use of controlled substances allowed on Owner's grounds. No reporting to work impaired by alcohol or controlled substances allowed.
- B. ALL contractors are to refrain from conversing with County personnel, building occupants, and visitors. Any construction employees found doing so, will be removed from the site.
- C. ALL contractors are to refrain from using indecent language. All doing so, will be removed from the site.

1.18 COST BREAKDOWN

- A. Contractors will identify the costs associated with each element of the work. Refer to Sections 01 29 73 and 01 29 76.

1.19 SALVAGE ITEMS

- A. Contractors will remove and turn over items indicated on the drawings or items which the Owner wishes to salvage.
- B. Carefully remove, handle and store materials at the site as directed by the Architect.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

* * * * *

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Requirements Specified Elsewhere
 - 1. Section 01 29 73 - Schedule of Values.
- B. Include in the Base Bid a Lump Sum Contingency Allowance as indicated.
- C. The overhead and profit for the allowance shall be included in the Base Bid and are not part of the allowances.
- D. The contingency allowance shall be used only upon written authorization of the Architect and the Owner's Representative.
- E. At the closeout of the Project, monies remaining in the Contingency Allowance will be credited to the Owner by Change Order.

1.02 ALLOWANCES

- A. GENERAL CONSTRUCTION
 - 1. Included in the Base Bid is the sum of **One Hundred Fifty Thousand Dollars (\$150,000)** to cover the actual cost of Work resulting from unforeseen conditions discovered during the progress of the Work and for work beyond the scope of the Contract Documents.
- B. PLUMBING CONSTRUCTION
 - 1. Included in the Base Bid is the sum of **Twenty Thousand Dollars (\$20,000)** to cover the actual cost of Work resulting from unforeseen conditions discovered during the progress of the Work and for work beyond the scope of the Contract Documents.
- C. MECHANICAL CONSTRUCTION
 - 1. Included in the Base Bid is the sum of **Forty Thousand Dollars (\$40,000)** to cover the actual cost of Work resulting from unforeseen conditions discovered during the progress of the Work and for work beyond the scope of the Contract Documents.
- D. ELECTRICAL CONSTRUCTION
 - 1. Contingency Allowance included in the Base Bid is the sum of **Fifty Thousand Dollars (\$50,000)** to cover the actual cost of Work resulting from unforeseen conditions discovered during the progress of the Work and for work beyond the scope of the Contract Documents.
 - 2. Security Allowance included in the Base Bid is the sum of **Thirty Thousand Dollars (\$30,000)** to cover the actual cost to furnish, install, configure and test access control hardware. All work shall be performed by I.K. Systems as directed by the County.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

* * * * *

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Measurement and payment - unit prices.

1.02 MEASUREMENT AND PAYMENT

- A. Authority: Measurement methods are delineated in the individual specification sections and outlined below.
- B. The Architect will take measurements and compute quantities accordingly. Provide and assist in the taking of measurements.
- C. Unit Quantities: Quantities and measurements indicated below are for base bid. If adjustments are directed, actual quantities provided will determine payment.
- D. Payment Includes: Full compensation for required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work, overhead and profit.

1.03 UNIT PRICES

- A. Unit Price L1: Soil Stabilization Fabric

Description: Installation of additional soil stabilization fabric as described in section 32 12 01.

Unit of Measurement: Per installed square yard (sy).

- B. Unit Price L2: Undercutting

Description: Undercutting where unsatisfactory soils are present at pavement subgrade. This includes excavation, removal, and backfill with compacted granular base material as described in Section 31 12 01.

Unit of Measurement: Per installed cubic yard (cy).

- C. Unit Price L3: 4" Storm Water Management Trench (SMT)

Description: 4" storm water management trench (SMT) piping, filter fabric and drainage stone, furnished and placed as described in Section 33 40 01.

Unit of Measurement: Per installed linear foot (lf).

- D. Unit Price L4: Medium Duty Asphalt

Description: Medium-duty asphalt, stabilization fabric and stone subbase as described in Section 32 12 01 and as detailed on the plans. This includes excavation and removals for placement of additional medium-duty asphalt.

Unit of Measurement: Per installed square yard (sy).

E. Unit Price L5: Rock Excavation

Description: Excavating or undercutting rock present at design subgrade, (either within the building footprint or site). This includes rock removal and disposal as described in Section 31 12 01. Note that 10 CY of rock excavation is in the Base Bid).

Unit of Measurement: Per removed cubic yard (cy).

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

* * * * *

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Descriptions of changes to Contract Amount and Contract Scope.

1.02 RELATED SECTIONS

- A. Instructions to Bidders, Bid Form: Requirements for Alternates.

1.03 SUBMISSION REQUIREMENTS

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

1.04 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely and fully integrate that work into the project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not specifically mentioned as part of the Alternate.

1.05 SCHEDULE OF ALTERNATES

- A. ALTERNATE NO. 1 – Re-Roof Existing Building (GC)

Each Bidder shall state the amount to be **ADDED** to the Base Bid to re-roof the existing building, as shown on the drawings and as specified.

- B. ALTERNATE NO. 2 – Roof Warranty – Existing Building (GC)

Each Bidder shall state the amount to be **ADDED** to the Base Bid to increase the total system roof warranty to 30 years on the existing building, as specified.

- C. ALTERNATE NO. 3 – Roof Warranty – Building Addition (GC)

Each Bidder shall state the amount to be **ADDED** to the Base Bid to increase the total system roof warranty to 30 years on the building addition, as specified.

- D. ALTERNATE NO. 4 – Rooftop Unit Replacement (GC, MC, EC)

Each Bidder shall state the amount to be **ADDED** to the Base Bid to replace the roof top units on the existing building and perform all associated work, as shown on the drawings and as specified.

- E. ALTERNATE NO. 5 – Communications Conduit (EC)

Each Bidder shall state the amount to be **ADDED** to the Base Bid to provide (2) 4-inch communications conduit to run parallel to the new electrical service for future use by the Owner, as shown on the drawings and as specified.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

* * * *

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 RELATED SECTIONS

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 29 76 - Progress Payment Procedures.
- C. Section 01 31 19 - Project Meetings.
- D. Section 01 32 16 - Construction Progress Schedule.

1.02 SUBMITTAL

- A. Submit Schedule of Values to the Architect within 10 days of receipt of Letter of Intent, but no later than 10 days prior to submitting the initial Application for Payment.
 - 1. The Schedule of Values will be the basis for Contractor's Application for Payment and is to be approved before first Application for Payment will be approved.
- B. Relate categories of Work directly to items used in the Construction Progress Schedule.
- C. Itemize dollar values for each category of Work.

1.03 FORM OF SUBMITTAL

- A. Submit typewritten Schedule of Values on AIA Documents G702 and G703, Architect Version.

1.04 PREPARING SCHEDULE OF VALUES

- A. Itemize separate line item costs for each of following general cost items:
 - 1. Project Administration
 - 2. Performance and Payment Bonds
 - 3. Insurance
 - 4. Allowances
 - 5. Field Supervision and Layout
 - 6. Project Meetings
 - 7. Temporary Facilities
 - 8. Project Closeout
 - 9. Project Record Documents
 - 10. Final Cleaning
- B. Itemize separate line item cost for work required by each basic activity or operation by section title and number. Use the Project Manual Table of Contents as a guide to establish the proper format for the Schedule of Values. Provide at least 1 line item for each Specification Section.
 - 1. Identification: Include the following project identification on the Schedule of Values:
 - a. Project names and locations.
 - b. Name of the Architect.
 - c. County Project Number(s).
 - d. Contractors name and address.
 - e. Date of submittal.

- C. Itemize each awarded Alternate as a separate line item with a detailed breakdown, as required.
- D. Show total costs including materials, labor, overhead and profit.
 - 1. Breakdown of the Contract Sum should be provided in sufficient detail to facilitate continued evaluation of Application for Payment and progress reports. Break principal subcontract amounts down into several line items.
 - 2. **Round amounts to nearest whole dollar; the total shall equal the Contract Sum.**
 - 3. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on site and items stored off site. Include requirements for insurance and bonded warehousing, if required.

1.05 REVIEW AND RESUBMITTAL

- A. After review by the Architect, revise and resubmit Schedule of Values.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

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SECTION 01 29 76

PROGRESS PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED SECTIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment
 1. Coordinate the Schedule of Values and Application for Payment with the Contractor's Construction Progress Schedule, Submittals, and List of Subcontracts.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous application and payment as certified by the Architect and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the Final Application involve additional requirements.
 2. **For the initial Application for Payment, submit copies of OSHA 10 Cards for each employee working on the project, including subcontractors. For subsequent payment applications, OSHA 10 cards will only need to be submitted for new /additional employees working on the project, that were not submitted with the initial payment application.**
- B. Payment-Application Times: Each progress-payment date is indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement. Dates for progress payments will be discussed at the initial construction progress meeting. The period covered by each Application for Payment is the previous month.
- C. Application and Certification for Payment Forms: Use AIA Document G702 and Continuation Sheet G703 as the form for Application and Certification for Payment.
- D. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the contractor. The Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions are made.
 2. **Submitted costs are to be rounded to the nearest whole dollar.**
 3. Include amounts of fully executed Change Orders and Allowance Disbursements.
 4. Provide copies of approved Change Order and Allowance Disbursement Cover Sheets with Applications for Payment.
 5. Provide copies of payrolls (including subcontractors) that are signed and notarized, documenting compliance with prevailing wage laws.
- E. Transmittal: Submit **(3)** signed and notarized original copies of each Application and Certification for Payment to the Architect, including vouchers, waivers of lien and similar attachments. **Include one copy of all certified payroll reports, including subcontractors.**
 1. Transmit with a transmittal form listing attachments and recording appropriate information related to the application in a manner acceptable to the Architect.

- F. Waivers of Mechanics Lien: With each Application and Certification for Payment after the first, submit waivers of mechanics liens from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application. **Release and Waiver of Lien Form attached.**
1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - a. Submit Applications for Payment with final waivers from every entity involved with performance of the work covered by the application who is lawfully entitled to a lien.
- G. Oneida County Voucher Form: With EACH Application and Certification for Payment, fill out and submit the Oneida County Voucher Form. The Form can be found at: <http://ocgov.net/assets/AuditControl/Docs/Voucher-OneidaCountyNY.pdf>
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with the submittal for the first Application for Payment include the following. The initial payment application will not be processed until all of these actions and submittals have been received by the Architect.
1. Schedule of Values
 2. Performance and Payment Bonds
 3. List of subcontractors and principal suppliers and fabricators
 4. Worker Compensation Certificates
 5. Contractor's Construction Schedule
 6. Submittal Schedule
 7. Emergency Contact List
- I. Application for Payment at Substantial Completion: Following assurance of the Certificate of Substantial Completion AIA Document G704, submit an Application and Certificate for Payment.
1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the work.
 2. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals
 - b. Warranties (guarantees) and maintenance agreements
 - c. Test/adjust/balance reports
 - d. Maintenance instructions
 - e. Meter readings
 - f. Start-up performance reports
 - g. Change-over information related to Owner's occupancy, use, operation and maintenance
 - h. Final cleaning
 - i. List of incomplete work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application and Certificate for Payment include the following.
1. Completion of project closeout requirements
 - a. Oneida County Forms: **Guarantee** and **Compliance with Labor Rates**
 - b. AIA G706, AIA G706A, and AIA G707
 2. Completion of items specified for completion after Substantial Completion
 3. Ensure that unsettled claims will be settled
 4. Ensure that incomplete work is not accepted and will be completed without undue delay

5. Transmittal of required project construction records and turn-over items (attic-stock) to the Owner
6. Removal of temporary facilities and services
7. Removal of surplus materials, rubbish, and similar elements

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

* * * * *

ATTACHMENT

RELEASE AND WAIVER OF LIEN

State of: _____

County of: _____

Date: _____

I, _____, of _____, upon my oath, hereby state that I am the Trade Subcontractor and/or Material Supplier, or his Authorized Agent, who has contracted with **Oneida County** to furnish the necessary labor, materials, and equipment for the project known as **Cornell Cooperative Extension, Addition & Alterations, 121 Second Street, Oriskany, NY 13424.**

Upon receipt of the funds requested in Application #____, it is stated that all bills, invoices, and other charges incurred by this Contractor and/or Material Supplier and its Subcontractors for labor and materials furnished by any and all parties upon and for said project will be fully paid and discharged, including all applicable taxes.

Prime Contractor

Trade Subcontractor and/or Material Supplier

By: _____
(Company)

(Print Name)

(Signature)

(Date)

SEAL:

Subscribed and sworn to before me on
this _____ day of _____, 20____

My commission expires:

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Submit, to the Architect, shop drawings, product data and samples required by the specification sections.
- B. **Attached is the Submittal Cover Sheet that is to be copied, filled out, attached to each item submitted, and returned to the Architect.**

1.02 SHOP DRAWINGS

- A. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate some portion of the work showing fabrication, layout, setting or erection details.
 - 1. Identify details by reference to sheet and detail numbers shown on shop drawings.
 - 2. Sheet size, multiple of 8-1/2 by 11 inches, not to exceed size of contract drawings when unfolded.
 - 3. Photographic reproductions of contract drawings will not be accepted as shop drawings and will be rejected.

1.03 PRODUCT DATA

- A. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts and other standard descriptive data.
 - 1. Modify product data to delete information which is not applicable to project.
 - 2. Supplement standard to provide additional information applicable to project.
 - 3. Clearly mark data to identify applicable materials, products or models.
 - 4. Show dimensions and clearances required.
 - 5. Submit Material Safety Data Sheets (MSDS) for all materials.

1.04 FORM OF SUBMISSION

- A. Shop Drawings and Product Data shall be submitted **electronically** to the Architect in Adobe Acrobat (pdf) Format to: submittals@marchassoc.com.
- B. Samples and Color Charts shall be delivered to the Architect in the required quantities. **Finishes will not be selected from scanned copies.**
- C. When it is necessary to compile data from different sources, data shall be compiled into one (1) pdf file.
- D. When it is necessary to scan paper documents, scans must be clean and legible. Contractors are urged to use a color scanner when necessary.

1.05 CONTRACTOR RESPONSIBILITIES

- A. Do not start or install work requiring submittals until submittals meeting Contract Requirements have been returned to the Contractor.
- B. Review, approve, stamp and sign submittals prior to submission to Architect.
- C. Verify: Field measurements and field construction criteria.
- D. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect's review of submittals.

- E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals unless Architect gives written acceptance of the specific deviations.
- F. Notify Architect in writing, at time of submission, of deviations in submittals from requirements of Contract Documents.
- G. After Architect's review, Contractor is to distribute copies of submittals to parties requiring same for coordination of work.
- H. Make required copies for distribution of shop drawings and product data that have been stamped and signed by the Architect.

1.06 SUBMISSION REQUIREMENTS

- A. Schedule submission to allow **10** working days for review.
- B. Submit number of samples specified.
- C. Accompany submittal with transmittal letter containing,
 - 1. Date.
 - 2. Architect project title and number.
 - 3. Contractor's name and address.
 - 4. Notification of deviations from Contract Documents.
 - 5. Additional pertinent data.
- D. Submittals shall include:
 - 1. Date and revision dates.
 - 2. Architect project title and number.
 - 3. The names of:
 - a. Architect.
 - b. Contractor.
 - c. Subcontractor.
 - d. Supplier.
 - e. Manufacturer.
 - 4. Identification of product.
 - 5. Relation to adjacent structure of materials.
 - 6. Field dimensions, clearly identified as such.
 - 7. Technical Specification section number.
 - 8. Applicable standards.
 - 9. A blank space, 4 x 4 inches, for the Architect's review stamp.
 - 10. Identification of deviations from Contract Documents.
 - 11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.
 - a. Submittals without Contractor's stamp will be returned without being reviewed.
- E. Shop Drawing Submittal Cover Sheet
 - 1. Attach submittal cover sheet, with all blanks filled in for each shop drawing, product data, and sample.

1.07 RESUBMISSION REQUIREMENTS

- A. Shop Drawings
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal.
 - 2. Indicate on drawings changes which have been made other than those requested by the Architect.

- B. Product Data and Samples: Submit new data and samples as required for initial submittal.

1.08 CONTRACTOR'S DISTRIBUTION OF SUBMITTALS

- A. Distribute copies of shop drawings and product data which carry the Architect's stamp to:
 - 1. Contractor's file.
 - 2. Job site file.
 - 3. Record Document file.
 - 4. Other Contractors, as required for coordination.
 - 5. Subcontractors, as required for coordination.
- B. Distribute samples as directed by Architect.

1.09 ARCHITECT

- A. Review design concept of Project.
- B. Review of separate items does not constitute review of an assembly in which item functions.
- C. Stamp and initial or sign certifying to review of submittal.
- D. Explanation of Architect's Stamp
 - 1. NO EXCEPTION TAKEN (NET): No corrections, no marks.
 - 2. MAKE CORRECTIONS NOTED (MCN): Minor amount of corrections; all items can be fabricated at Contractor's risk without further correction; checking is complete and all corrections are obvious without ambiguity.
 - 3. REVISE AND RESUBMIT (R&R): Minor amount of corrections; noted items must not be fabricated without further correction; checking is not complete; details of items noted by checker are to be further clarified; items not noted to be corrected can be fabricated at Contractor's risk under this stamp.
 - 4. REJECTED: Drawings are rejected as not in accordance with the Contract, too many corrections, or other justifiable reason. The drawing must be corrected and resubmitted. No items are to be fabricated under this stamp.
 - 5. SUBMIT SPECIFIED ITEM (SSI): Item is not as specified. Submit named manufacturer.
- E. Return submittals to Contractor for distribution.

1.10 SUBMITTALS REQUIRED FOR REVIEW

- A. The following is the Submittal Cover Sheet to be attached to the required submittals. Contractor is responsible for reviewing each section to determine required submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

* * * * *

ATTACHMENT

SUBMITTAL COVER SHEET

Contractor: _____

Address: _____

Phone: _____

Email: _____



258 Genesee Street, Suite 300 • Utica, New York 13502
315.733.3344 • marchassoc.com

Email submittals directly to: submittals@marchassoc.com

Name of Project: **OCDPW – Cornell Cooperative Extension, Addition & Alterations**

Type of Submittal: (Check) *Is this a resubmittal?* [] Yes Submission Date: _____

☐ Shop Drawing	☐ Schedule	☐ Sample
☐ Product Data	☐ Certificate	☐ Color Sample
☐ Test Report	☐ Warranty	☐ _____
☐ _____	☐ _____	☐ _____

DESCRIPTION:

PRODUCT NAME: _____

MANUFACTURER: _____

ADDRESS: _____

SUBCONTRACTOR/
SUPPLIER: _____

REFERENCES:

SPEC. SECTION NO. _____ DRAWING NO(S): _____

PARAGRAPH: _____ RM. OR DET. NO(S): _____

ARCHITECT REVIEW STAMP

NO EXCEPTION TAKEN [] MAKE CORRECTIONS NOTED []

REJECTED [] REVISE AND RESUBMIT []

SUBMIT SPECIFIED ITEM []

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Notations are subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; Fabrication processed and techniques of construction; Coordination of his work with that of all other trades and the satisfactory performance of his work.

Date: _____ By: _____

MARCH ASSOCIATES – UTICA, NY

CONTRACTORS APPROVAL STAMP:

Architects Remarks:

MARCH OFFICE USE: Date Rec'd: _____

MARCH Log # _____

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Requirements Specified Elsewhere
 - 1. Section 01 11 00 - Summary of Work.
 - 2. Section 01 32 16 - Construction Progress Schedules.
- B. Architect and Construction Manager: Schedule and administer progress meetings.
 - 1. Prepare agendas.
 - 2. Make physical arrangements for meetings.
 - 3. Preside at meetings.
 - 4. Record minutes; include significant proceedings and decisions.
 - 5. Distribute copies of minutes to participants.
 - 6. Furnish copies of minutes to parties in attendance.
- C. Architect and Construction Manager will attend meetings to ascertain that Work is expedited consistent with Contract Documents and construction schedule.

1.02 PRE-CONSTRUCTION MEETING

- A. Schedule within seven (7) days after award of contract.
- B. Attendance:
 - 1. County representatives
 - 2. Architect
 - 3. Contractors' representative, including Project Superintendent
- C. Minimum Agenda
 - 1. Introduction
 - 2. Record documents
 - 3. Use of Premises
 - a. Field office and storage area
 - b. Owner's requirements
 - 4. Distribute and discuss:
 - a. List of major subcontractors
 - b. Tentative Construction Schedule
 - 5. Designation of responsible personnel for coordination of work.
 - 6. Major equipment deliveries and priorities.
 - 7. Change Order procedure.
 - 8. Distribution of Contract Documents.
 - 9. Shop drawings, product data, and samples.
 - 10. Clean-up procedures.
 - 11. Location and time for progress meetings.
 - 12. Review of initial Construction Schedule.

1.03 PROGRESS MEETINGS

- A. Schedule for regular meetings will be set up at the preconstruction meeting. Meetings will be held as events dictate and as the work requires.
- B. Location and time of meetings will be determined at the pre-construction meeting.
- C. Attendance

1. Owner's Representative
2. Architect
3. Contractors' Project Superintendent
4. Subcontractors pertinent to agenda

D. Minimum Agenda

1. Review minutes of previous meeting.
2. Review and note field observations, problems and decisions.
3. Identify present problems and resolve.
4. Plan work progress during next work period and its effect on related work of others.
5. Review shop drawings and submittal schedules.
6. Review change order status.
7. Review status of construction schedule.
8. Coordinate occupancy arrangements and access requirements with Owner.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

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SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Prepare the Construction Schedule and submit to the Architect and Owner.

1.02 SUBMITTALS

- A. Submit initial schedule at pre-construction meeting.
 - 1. Architect and Owner will review schedule and return reviewed copy within 5 days after receipt.
 - 2. Re-submit schedule within 5 days after return of reviewed copy.
- B. The Construction Schedule shall be completed and approved prior to submission of the first payment application.

1.03 CONSTRUCTION SCHEDULE DESCRIPTION

- A. Before the Work is started, prepare a sequential list of work items which constitutes the Work on the project. Schedule shall allow ample time for completion of Work prior to the contract completion date.

1.04 CONTENT OF SCHEDULE

- A. A complete sequence of construction activity.
- B. Dates for beginning, and completion of, each element of Work.
- C. The Construction Schedule shall be a bar chart schedule, divided into units based on the various work of section described in the divisions of the Contract Documents. The bar chart shall show the various sub-divisions of such work. This Construction Schedule shall show time of shop drawing submittal, with reasonable time for approval, and shall show schedule for completion of each unit of work.

1.05 UPDATING

- A. Update the schedule to show all changes occurring since previous submission of schedule.
- B. Indicate progress of each activity.
- C. Include:
 - 1. Actual progress to date, indicated by a vertical line through the Category of Work.
 - 2. Major changes in scope.
 - 3. Activities modified since previous updating.
 - 4. Revised projection due to changes.
- D. Submit Construction Schedule updates with each monthly payment request.
- E. If during the progress of the work, the Contractor falls behind the approved schedule, a schedule showing daily progress shall be promptly submitted. The owner reserves the right to withhold payment until such time as the Contractor submits a daily schedule showing work to be again on schedule with the Construction Schedule and until the Work is being installed according to the approved Construction Schedule, without additional cost to the Owner. Approved delays for changes in the work will be recognized as

extending this Construction Schedule, but such items as delays due to resubmitting of shop drawings, will not be approved as cause for an adjustment to the construction schedule.

1.06 DISTRIBUTION

- A. Owner's Representative.
- B. Architect.
- C. Contractors as required for coordination of Work.
- D. Job site files.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

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SECTION 01 45 33

CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes: Requirements for Code-Required Special Inspections and Procedures. The Owner shall employ one Special Inspection Manager and one or more Special Inspectors to provide inspections during construction.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Documents requirements.
 - 1. Requirement for the contractor to provide quality control services required by Architect or Authorities having jurisdiction are not limited by provisions of this section.

1.02 DEFINITIONS

- A. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.
 - 1. Independent: An approved agency shall be objective and competent. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.
 - 2. Equipment: An approved agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated.
 - 3. Personnel: An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.
- B. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved Special Inspector who is present in the area where the work is being performed.
- C. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved Special Inspector who is present in the area where the work has been or is being performed and at the completion of the work.
- D. Quality Assurance Service: Activities, actions and procedures performed before and during execution of the work to guard against defects and deficiencies and ensures that proposed construction complies with requirements.
- E. Special Inspection Manager: Special Inspection Manager collects, Review for completeness and distributes special inspection reports to the Code Enforcement Official, the Engineer/Architect of Record and the Construction Manager. The Special Inspection Manager shall schedule and coordinate work of the Special Inspectors with the Contractors.
- F. Code Enforcement Official: Authority Having Jurisdiction.

1.03 REGULATORY REQUIREMENTS

- A. Copies of Regulations: Obtain copies of the following regulations and retain at the project site to be available for reference by parties who have a reasonable need.
 - 1. Chapter 17 – “Special Inspections and Tests” of the 2020 Building Code of New York State (BCNYS), November 2019.
- B. Building Permit Requirement: The permit applicant shall submit a statement of special inspections prepared by the registered design professional in responsible charge as a condition for permit issuance.

1.04 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
1. ACI International (ACI)
 - a. ACI 318/318R (2005) Building Code Requirements for Structural Concrete and Commentary.
 - b. ACI 530-530.1 (2005) Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.
 2. American Institute of Steel Construction (AISC)
 - a. AISC (1989) Manual of Steel Construction – Allowable Stress Design.
 3. American Society for Testing and Materials (ASTM)
 - a. ASTM A435-90 (2001) Straight Beam Ultrasonic Examination of Steel Plates.
 - b. ASTM A 615 (2004a) Deformed and Plain Billet-steel Bars for Concrete Reinforcement.
 - c. ASTM A 898-91 (2001) Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes.

1.05 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A Professional Engineer who is legally qualified to practice in the State of New York and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- B. Special Inspector: Provide a Special Inspector at the work site for each of the areas of responsibilities, specified below, who shall assist and report to the Special Inspection Manager, Owner, Engineer/Architect of Record and the Construction Manager and who shall have no duties other than their assigned quality control duties. Special Inspectors are required to be physically present at the construction site to perform the phases of control and prepare documentation for each definable feature of work in their area of responsibility at the frequency specified.

The Special Inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the code enforcement official, for inspection of the particular type of construction or operation requiring special inspection. Special Inspectors shall satisfy the minimum qualification requirements outlined in Table 1704.1 of the Building Code of New York State, Chapter 17 and as outlined below and shall be engaged for the activities indicated.

1. Requirement for Special Inspectors shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade union jurisdictional settlements and similar conventions.
2. Concrete:
 - a. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - b. Personnel performing laboratory tests shall be ACI certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I.
 - c. Testing Agency laboratory supervisor shall be an ACI certified Concrete Laboratory Testing Technician, Grade II.

3. Smoke Control Systems:
 - a. Personnel conducting field tests shall be qualified in fire protection engineering, mechanical engineering and certification as air balancer certified by AABC Test and Balance Technician.
4. Structural Steel: Registered Structural Engineer, (P.E.) in New York State with a minimum of 5-years experience.
5. Welding:
 - a. Personnel conducting field tests shall be qualified as Certified Welding Inspector (CWI) according to AWS QC1 or an equivalent certification program.

1.06 SPECIAL INSPECTIONS

- A. Scheduling Inspections: The Contractor shall notify the On-Site Owner's Representative, Agent or Construction Manager at least 24 hours in advance of the time when the Work that requires testing or inspecting will be performed.
- B. Inspection of Fabricators: Where fabrication of structural, load-bearing or lateral load-resisting members or assemblies is being conducted on the premises of a fabricator's shop, special inspection of the fabricated items shall be performed during fabrication and as required elsewhere in The Building Code of New York State (BCNYS).

Fabrication and implementation procedures. The Special Inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards. The Special Inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

Exception: Special inspections of a fabricator will not be required where the fabricator is approved and registered as follows:

1. As defined in Section 1704.2.5 of the BCNYS ("Special Inspection of fabricated items"), Special Inspections during fabrication as required by Section 1704.2.5 are not required where the fabricator maintains approved detailed fabrication and quality control procedures that provide a basis for control of the workmanship and the fabricator's ability to conform to the approved construction documents and the BCNYS. Approval shall be based upon review of fabrication and quality control procedures and periodic inspection of fabrication practices by the approved Special Inspector / Codes Enforcing Officer (CEO).
 2. Special Inspections are not required where the fabricator is registered and approved in accordance with Section 1704.2.5.1 ("Fabricator Approval") of the BCNYS. Special Inspections during fabrication are not required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspections. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved agency. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the Owner or the owner's authorized agent for submittal to the building official as specified in Section 1704.5 of the BCNYS stating that the work was performed in accordance with approved construction documents.
- C. Steel Construction: The special inspections for steel elements of buildings and structures shall be as required by Section 1704 and Section 1705.2 of The Building Code of New York State.
 1. Exceptions: Special inspection of the steel fabrication process shall not be required where the fabrication process for the entire building or structure does not include any welding, thermal cutting or heating operation of any kind. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification, grade and mill test reports for the main stress-carrying elements are capable of being

determined. Mill test reports shall be identifiable to the main stress-carrying elements when required by the approved construction documents.

- D. Structural Steel: Special Inspections and non-destructive testing of structural steel elements in buildings, structures and portions thereof shall be in accordance with Section 1705.2.1 of the referenced BCNYS and the quality assurance inspection requirements of AISC 360.
 - 1. Exceptions: Special inspection railing systems composed of structural steel elements shall be limited to welding inspection of welds at the base of cantilevered rail posts.
- E. Welding inspections shall be in compliance with AWS D1.1. The basis for welding inspector qualifications shall be AWD D1.1.
- F. Concrete Construction: The special inspections and verifications for concrete construction shall be as required by Section 1705.3 and Table 1705.3 of The Building Code of New York State.
- G. Masonry Construction: Masonry construction shall be inspected and evaluated in accordance with the requirements of Section 1705.4 of The Building Code of New York State.
- H. Soils: The special inspections for existing site soil conditions, fill placement and load bearing requirements shall be as required by Section 1705.6 and Table 1705.6 of The Building Code of New York State. The approved soils report (if available) and the requirements contained within the Contract Documents shall be used to determine compliance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 STATEMENT OF SPECIAL INSPECTIONS

- A. Refer to attached form "Statement of Code-Required Special Inspections and Procedures" at the end of this section.
- B. Refer to attached "Schedule of Code-Required Special Inspections and Procedures" at the end of this section.

3.02 SPECIAL INSPECTION REPORTS

- A. Report Requirement: Special Inspectors shall keep records of inspections. The Special Inspector shall furnish inspection reports to the Special Inspection Manager. The Special Inspection Manager shall furnish reports to the Code Enforcement Official, Owner, to the Engineer/Architect in responsible charge and to the Construction Manager.
 - 1. Reports shall indicate that work inspected was done in conformance to approved construction documents. As a minimum, the content of the special inspection reports shall be in accordance with Section 1705 of The Building Code of New York State.
 - 2. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Code Enforcement Official and to the Engineer/Architect in responsible charge prior to the completion of that phase of the work.
- B. Weekly Reports: On the first day of each week, the Special Inspector shall notify the Special Inspections Manager of any and all deficiencies identified within the previous week. The Special Inspections Manager shall notify all affected parties, including, but not limited to, the Contractor, the A/E and the on-site Owner's Representative or Agent.
- C. Monthly Report: On the first day of each month, the Special Inspector shall furnish to the Special Inspection Manager five copies of the combined progress reports of the special inspector's observations. The Special Inspection Manager shall furnish five reviewed copies to the Code

Enforcement Official and to the Engineer/Architect of responsible charge. These progress reports shall list all special inspections of construction or reviews of testing performed during that month, note all uncorrected deficiencies, and describe the corrections made both to these deficiencies and to previously reported deficiencies.

1. Each monthly report shall be signed by all special inspectors who performed special inspection of construction or reviewed testing during that month, regardless of whether they reported any deficiencies.
 2. Each monthly report shall be signed by the Contractor.
- D. Final Report: At completion of construction, each Special Inspector shall prepare and sign a final report attesting that all work they inspected and all testing and test reports they reviewed were completed in accordance with the approved construction documents and that deficiencies identified were satisfactorily corrected.
1. The Special Inspector shall submit a combined final report containing the signed final reports to the Special Inspection Manager.
 2. The Special Inspection Manager shall submit the combined final report to the Code Enforcement Official, Owner and to the Engineer/Architect in responsible charge.
 3. The Contractors shall sign the combined final report attesting that all final reports of Special Inspectors that performed work to comply with these construction documents are contained therein, and that the Contractor has reviewed and approved all of the individual inspector's final reports.
 4. Refer to attached form "Report of Code-Required Special Inspections and Procedures" attached at the end of this section.

END OF SECTION

ATTACHMENTS

CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

STATEMENT OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

Name of Project: Oneida County Department of Public Works
Cornell Cooperative Extension
Additions & Alterations

Address or Legal Description: Oneida County Department of Public Works
Cornell Cooperative Extension
Additions & Alterations
121 Second St, Oriskany, New York 13424

Owner's Name: Oneida County Department of Public Works
Cornell Cooperative Extension

Authority having Jurisdiction: New York Department of State
Reviewer:

I, _____ as the Owner (contractors may not employ the special inspector),
certify that I will be responsible for employing the special inspector(s) as required by the Building Code of
New York State Section 1704 for the construction project located at the site listed above.

Signed: _____

I, _____ as the Architect of Record,
certify that I have prepared the following special inspections program as required by the Building Code of
New York State Section 1704 for the construction project located at the site listed above.

Printed Name: _____

Seal:

Signature: _____ Date: _____

LIST OF WORK REQUIRING SPECIAL INSPECTIONS

(SEE ATTACHED SCHEDULE)

CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES REPORT FORM

REPORT TYPE:

- ☐ Continuous
☐ Periodic
☐ Final

WORK MATERIAL INSPECTED:

PROJECT NAME:

Address or Legal Description:

Owner's Name:

Phone:

Fax:

APPROVED INSPECTION AGENCY:

Address:

Phone:

Fax:

AUTHORITY HAVING JURISDICTION:

Address:

Phone:

Fax:

ENGINEER/ARCHITECT OF RECORD:

Address:

Phone:

Fax:

STATEMENT OF CONFORMANCE:

Discrepancies:

1. None _____
 - a. Contractor Review:
 - b. Contractor Signature:
 - c. Contractor Correction:

Outstanding Discrepancies:

1. None _____
 - a. Authority having Jurisdiction Review:
 - b. Registered Design Professional Review:

END OF FORM

SCHEDULE OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES								
Inspection Required	Material/Work to be Inspected	Scope of Inspection	Inspection Frequency	Reference Standard	Report Type	BCNYS Section	Inspector Qualifications	Approved Agency
(See Legend of Bldgs Below)								
INSPECTION OF FABRICATORS								
NOTE 1: See Specification Section 01 45 33, Paragraph 1.06 for Additional Information regarding "Exception" requirements for Inspection of Fabricators.								
Yes (See Note 1)	Inspections of fabricated load bearing members and assemblies	On premise inspection of fabricated items	Continuous	NA	Inspection Report	1704.2.5, 1705.2	Per Chapter 17	See Legend Below
Yes (See Note 1)	Fabricators detailed fabrication and quality control procedures - Structural Steel	Review fabricator's fabrication and quality control procedures to ensure capability to perform required work	Continuous - Prior to fabrication of each fabrication run	NA	Inspection Report	1704.2.5, 1705.2	Per Chapter 17	See Legend Below
Yes (See Note 1)	Fabricator Approval - Structural Steel	Review and approval of fabricator's written procedural and quality control manuals. Obtain fabricator's Certification of Compliance	Review and approval prior to fabrication; Certificate of compliance for each fabrication run	NA	Inspection report with attached Certificate of Compliance	1704.2.5, 1705.2	Per Chapter 17	See Legend Below
STEEL CONSTRUCTION								
Yes	-	Material verification of high-strength bolts, nuts and washers	Verify identification markings conform to ASTM standards specified in the approved Construction Documents	Periodic	Applicable ASTM material specification; AISC 360, Section A3.3	Inspection Report	1704, 1705.2	Per Chapter 17 See Legend Below
Yes	-	Material verification of high-strength bolts, nuts and washers	Manufacturer's certificate of compliance required	Periodic	Applicable ASTM material specification; AISC 360, Section M2.5	Inspection Report	1704, 1705.2	Per Chapter 17 See Legend Below
Yes	-	Inspection of high-strength bolting	Bearing-type connections	Periodic	AISC 360 Section M2.5, N5, N5.6	Inspection Report	1704, 1705.2	Per Chapter 17 See Legend Below
Yes	-	Inspection of high-strength bolting	Slip-critical connections	Continuous and/or Periodic - see AISC 360 Section N5.6	AISC 360 Section M2.5, N5, N5.6	Inspection Report	1704, 1705.2	Per Chapter 17 See Legend Below
Yes	-	Material verification of structural steel	Verify identification markings conform to ASTM standards specified in the approved Construction Documents	Periodic	ASTM A6 or ASTM A568	Inspection Report	1704, 1705.2	Per Chapter 17 See Legend Below
Yes	-	Material verification of structural steel	Manufacturer's certificate of compliance required	Periodic	ASTM A6 or ASTM A568	Inspection Report	1704, 1705.2	Per Chapter 17 See Legend Below

SCHEDULE OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES									
Inspection Required		Material/Work to be Inspected	Scope of Inspection	Inspection Frequency	Reference Standard	Report Type	BCNYS Section	Inspector Qualifications	Approved Agency
(See Legend of Bldgs Below)									
Yes	-	Material verification of weld filler materials	Verify identification markings conform to AWS standards specified in the approved Construction Documents	Periodic	AISC 360 Section A3.5, N5, N5.4	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Material verification of weld filler materials	Manufacturer's certificate of compliance required	Periodic	AISC 360 Section A3.5, N5	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of welding: Structural steel	Complete and partial penetration groove welds	Continuous	AWS D1.1	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of welding: Structural steel	Multi-pass fillet welds	Continuous	AWS D1.1	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of welding: Structural steel	Single-pass fillet welds greater than 5/16"	Continuous	AWS D1.1	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of welding: Structural steel	Single-pass fillet welds less than or equal to 5/16"	Periodic	AWS D1.1	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of welding: Structural steel	Floor and roof deck welds	Periodic	AWS D1.3	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of welding: Reinforcing steel to existing steel	Verification of weldability of reinforcing steel to existing steel	Periodic	AWS D1.3	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of steel frame joint details for compliance with approved construction documents	Details such as bracing and stiffening	Periodic	NA	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of steel frame joint details for compliance with approved construction documents	Member locations	Periodic	NA	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Inspection of steel frame joint details for compliance with approved construction documents	Application of joint details at each connection	Periodic	NA	Inspection Report	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Steel fabrication process not utilizing any welding, thermal cutting or heating operation of any kind	Verification of fabricators compliance with requirements of BCNYS 1705.2	Periodic	NA	Statement of Verification	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Verify use of periodic inspections for single pass fillet welds not exceeding 5/16" in size	Verification of materials, welding procedures and qualification of welders	Prior to the start of work and for each welder	NA	Statement of Verification	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Verify use of periodic inspections for floor and roof deck welding	Verification of materials, welding procedures and qualification of welders	Prior to the start of work and for each welder	NA	Statement of Verification	1704, 1705.2	Per Chapter 17	See Legend Below

SCHEDULE OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES									
Inspection Required		Material/Work to be Inspected	Scope of Inspection	Inspection Frequency	Reference Standard	Report Type	BCNYS Section	Inspector Qualifications	Approved Agency
(See Legend of Bldgs Below)									
-	No	Verify use of periodic inspections for welded sheet steel form cold-formed steel framing members such as studs and joists	Verification of materials, welding procedures and qualification of welders	Prior to the start of work and for each welder	NA	Statement of Verification	1704, 1705.2	Per Chapter 17	See Legend Below
Yes	-	Verify use of periodic inspections for welding of stairs and railing systems	Verification of materials, welding procedures and qualification of welders	Prior to the start of work and for each welder	NA	Statement of Verification	1704, 1705.2.1	Per Chapter 17	See Legend Below
CONCRETE CONSTRUCTION									
Yes	-	Concrete testing	Absence of test data	NA	Ch. 3, ACI 318	Statement of Conformance	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Concrete reinforcement	Inspection of reinforcing steel and placement	Periodic - Prior to each concrete placement	Per BCNYS Table 1705.3	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Bolts and other embedded inserts	Inspect bolts to be installed in concrete prior to and during placement of concrete	Continuous - prior to each concrete placement Continuous - During concrete placement	Per BCNYS Table 1705.3	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Design Mix	Verify use of required design mix	Periodic	Per BCNYS Table 1705.3	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Concrete strength	Strength test	Continuous - See Project Manual and Reference Standard	ACI 318 ASTM C31, ASTM C39	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Sampling and testing of fresh concrete	Sampling fresh concrete and performing slump, air content tests, field temperature and strength test specimen preparation	Continuous - See Project Manual and Reference Standard	Per BCNYS Table 1705.3	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Concrete placement	Inspection of concrete placement for proper application technique	Continuous	Per BCNYS Table 1705.3	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Concrete curing	Inspection for maintenance of specified curing temperature and technique	Periodic	Per BCNYS Table 1705.3	Inspection Report	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Isolated concrete footings	Concrete construction special inspections in accordance with BCNYS 1705.3	Refer to Special Inspection Schedule	NA	NA	1705.3, Table 1705.3	Per Chapter 17	See Legend Below

SCHEDULE OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES									
Inspection Required		Material/Work to be Inspected	Scope of Inspection	Inspection Frequency	Reference Standard	Report Type	BCNYS Section	Inspector Qualifications	Approved Agency
(See Legend of Bldgs Below)									
Yes	-	Continuous concrete footings supporting walls	Concrete construction special inspections in accordance with BCNYS 1705.3	Refer to Special Inspection Schedule	NA	NA	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Nonstructural concrete slabs on ground (grade)	Concrete construction special inspections in accordance with BCNYS 1705.3	Refer to Special Inspection Schedule	NA	NA	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Concrete foundation walls	Concrete construction special inspections in accordance with BCNYS 1705.3	Refer to Special Inspection Schedule	NA	NA	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
-	No	Concrete patios, driveways and sidewalks, on grade (ground)	Concrete construction special inspections in accordance with BCNYS 1705.3	Refer to Special Inspection Schedule	NA	NA	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
Yes	-	Inspection of Formwork	Inspect formwork for shape, location and dimensions of the concrete member being formed in accordance with BCNYS Table 1705.3	Periodic	NA	NA	1705.3, Table 1705.3	Per Chapter 17	See Legend Below
MASONRY CONSTRUCTION - GENERAL									
-	No	Engineered masonry in Risk Category I, II & III facilities	Masonry construction special inspections in accordance with BCNYS 1705.4	Refer to Special Inspection Schedule	TMS 402 / ACI 530/ ASCE 5 and TMS 602 / ACI 530.1/ ASCE 6	--	1705.4	Per Chapter 17	See Legend Below
WOOD CONSTRUCTION									
-	No	-	-	-	-	-	-	-	-
SOILS									
Yes	-	Site Preparation	Inspect to verify that the site has been prepared in accordance with approved soils (if applicable) report and Contract Documents	Periodic - Prior to placement of any fills or construction work	Contract Documents	Inspection Report	1705.6, Table 1705.6	Per Chapter 17	See Legend Below
Yes	-	Confirm site soil conditions/soil bearing capacity	Observe site conditions to confirm site soil conditions and soil bearing capacity are adequate and consistent with approved soil report (if applicable) and Contract Documents	Periodic - Prior to fill or foundation work	Contract Documents	Inspection Report	1705.6, Table 1705.6	Per Chapter 17	See Legend Below

SCHEDULE OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES									
Inspection Required		Material/Work to be Inspected	Scope of Inspection	Inspection Frequency	Reference Standard	Report Type	BCNYS Section	Inspector Qualifications	Approved Agency
(See Legend of Bldgs Below)									
Yes	-	Verify Excavations	Inspect to verify that the excavations are extended to proper depths and have reached proper bearing material in accordance with approved soils (if applicable) report and Contract Documents	Periodic - Prior to placement of any fills or construction work	Contract Documents	Inspection Report	1705.6, Table 1705.6	Per Chapter 17	See Legend Below
Yes	-	Classification and Testing of Controlled Fill	Perform classifications and testings to verify that controlled fill materials meet requirements of approved soil report (if applicable) and Contract Documents	Periodic - During placement and compaction of the fill material	Contract Documents	Inspection Report	1705.6, Table 1705.6	Per Chapter 17	See Legend Below
Yes	-	Placement of Fill	Inspect to verify the use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill materials meet requirements of approved soil report (if applicable) and Contract Documents	Continuous - During placement and compaction of the soil/fill material	Contract Documents	Inspection Report	1705.6, Table 1705.6	Per Chapter 17	See Legend Below
Yes	-	Prior to placement of controlled fill, confirm site soil conditions / soil bearing capacity / subgrade preparation	Prior to placement of controlled fill material, observe site conditions and subgrade to verify site soil conditions and soil bearing capacity consistent with approved soil report (if applicable) and Contract Documents	Periodic - Prior to fill or foundation work	Contract Documents	Inspection Report	1705.6, Table 1705.6	Per Chapter 17	See Legend Below
SPRAYED FIRE-RESISTANT MATERIALS									
-	No	-	-	-	-	-	-	-	-
WALL PANELS AND VENEERS									
-	No	-	-	-	-	-	-	-	-
EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)									
-	No	-	-	-	-	-	-	-	-
SMOKE CONTROL									
-	No	-	-	-	-	-	-	-	-
OTHER									
-	No	-	-	-	-	-	-	-	-

SCHEDULE OF CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES								
Inspection Required	Material/Work to be Inspected	Scope of Inspection	Inspection Frequency	Reference Standard	Report Type	BCNYS Section	Inspector Qualifications	Approved Agency
(See Legend of Bldgs Below)								

LEGEND OF APPROVED SPECIAL INSPECTION AGENCIES

I.D.	AGENCY/CONTACT PERSON	ADDRESS/PHONE/FAX NUMBER
A	CME Associates, Inc. Attn: Neil Zurn	6035 Corporate Drive, East Syracuse, NY 13057 P: (315) 701-0522 F: (315) 701-0526
B	Atlantic Testing Laboratories, Ltd. Attn: William J. Bell, CWI, CET	301 St. Anthony Street, Utica, NY 13501 P: 315-735-3309 F: 315-735-0742
C	Quality Inspection Services, Inc. Attn: Ian Richardson	6730 Myers Road, E. Syracuse, NY 13057 P: 518-899-3230
D	Terracon Consultants - NY, Inc Attn: Mike McHenry, Materials Dept. Manager	30 Corporate Circle, Suite 201, Albany, NY 12203 P: 518-266-0310

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Contractor shall provide temporary facilities throughout the construction period unless otherwise indicated.
- B. Contractor shall pay costs for providing, maintaining, moving and removing temporary facilities unless otherwise indicated.
- C. Related Requirements Specified in other Sections:
 - 1. Section 01 11 00 - Summary of Work.
 - 2. Section 01 29 73 - Schedule of Values.

PART 2 – PRODUCTS

2.01 TEMPORARY SITE FENCE

- A. General Contractor to Provide temporary fence to enclose staging area, assume 500 LF of fencing. Area will be designated after bid award and encompass area large enough for contractor's storage needs.
 - 1. Open-Mesh Fencing: Provide 0.12 inch (2 mm) thick, galvanized 2 inch (50 mm) chain-link fabric fencing, 6 feet (2 m) high with galvanized steel pipe posts, 1½ includes (38 mm) I.D. for line posts and 2½ includes (64 mm) I.D. for corner posts.

2.02 TEMPORARY SANITARY AND STORM FACILITIES

- A. General Contractor to provide temporary sanitary facilities for use by all.
 - 1. Provide one (1) unit per (10) workers on site with a minimum of two (2) units at all times.
 - 2. Provide hand washing/sanitizing facilities.
 - 3. Maintain all temporary facilities in a sanitary and clean condition at all times.

2.03 TEMPORARY WATER, HVAC, ELECTRIC

- A. Owner shall provide construction water at existing systems and pay for utility use charges.
 - 1. Contractor shall provide additional hoses and piping as required.
 - 2. Contractor shall provide potable water for drinking purposes for their personnel on the site.
- B. Contractor shall provide temporary heating, cooling, and/or ventilation systems as necessary to execute the work and to comply with the requirements of this Project.
- C. Owner shall provide construction power at existing systems and pay for utility use charges.
- D. Contractor shall provide additional wiring, breakers, lighting, etc. as necessary to execute the work and to comply with the requirements of this Project.

2.04 FIRE PROTECTION

- A. Provide and maintain portable fire extinguishers in each area where work is being performed. Number to conform to applicable codes.
- B. Fire Extinguishers: Multi-purpose (ABC) dry chemical.
- C. UL labeled.
- D. Take all necessary precautions to insure against fire during construction and be responsible that the area within contract limit is kept orderly and clean on a daily basis.
 - 1. No fires shall be built on the premises nor shall open flame devices of any kind be employed within the building except for field welding with supervised fire watch.
 - 2. Contractor shall provide shielding for heat and smoke detectors from accidentally going off. Contractors will be back charged for all fines imposed for false fire alarms.
 - 3. Provide proper exiting approved by the Fire Marshall and Construction Manager at the doors leading into the construction area at all times during Regular School Hours on Regular School Days.

2.05 CONTRACTOR'S FIELD OFFICE AND STORAGE TRAILERS

- A. Provide and maintain field office and storage trailers as needed. Space on site is extremely limited.
 - 1. Location will be established after bid awards.
- B. Provide temporary heat and power for field office and storage trailers if needed.
- C. Provide telephone for own use, if needed.
- D. Provide barriers to prevent unauthorized entry into construction/storage area.

2.06 TEMPORARY PARKING/STAGING

- A. Park and stage materials only in areas designated by the Owner. Contractor parking and staging areas will be designated after bid awards.
- B. Parking is limited.
 - 1. Park only in areas designated by the Owner.

2.07 STORAGE

- A. Storage space is limited and will be permitted only in exterior areas designated by the Owner.

2.08 DUST PROTECTION

- A. Contractor shall erect and maintain dust proof protection whenever operations will produce dust and dirt that could filter into the building or into finished areas.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all temporary facilities in accordance with applicable codes.
- B. Maintain temporary facilities throughout the construction period.

- C. Remove temporary facilities when they are no longer required or when directed by the Construction Manager.
- D. Notification of all utility interruptions is to be received by the Construction Manager in writing 72 hours prior to interruption.
- E. Repair damage to the project site caused by the installation of the temporary facilities.
- F. Contractors are not permitted to use the Owner's facilities for their own benefit.

* * * * *

SECTION 01 51 13

TEMPORARY ELECTRICITY

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 01 29 73 - Schedule of Values.
- B. Section 01 50 00 - Temporary Facilities and Controls.
- C. Section 01 51 23 - Temporary Heating, Cooling, and Ventilating.

1.02 DESCRIPTION OF SYSTEM

- A. Service Required: The Electrical Contractor shall provide temporary electric power for items listed throughout the construction period, so that power can be secured at any desired point with no more than a 100 (30.00m) foot extension.
 - 1. Provide power from existing panelboards for miscellaneous tools and equipment used in the construction work.
 - a. Provide distribution box with a minimum of four 20-amp, 120 volt grounded outlets.
 - b. Provide circuit breaker protection for each outlet, using Ground Fault Interrupting circuit breakers.
 - 2. Lighting for safe and adequate working conditions throughout building.
 - a. Maintain a minimum of 5 foot candles throughout all occupied spaces per OSHA Standards.
 - b. Use at least 100 watt lamps or equivalent.
 - 3. Power for testing and checking equipment.
 - 4. Task lighting is the responsibility of the contractor requiring such.
 - 5. Power for Contractor site offices is the responsibility of the Contractor requiring such office.
 - 6. Power for welding units is the responsibility of the contractor requiring such units.
- B. Capacity
 - 1. Provide and maintain adequate electrical service for construction use by all trades during the construction period at the locations necessary.
 - 2. Notify the power company if unusually heavy loads will be connected.
- C. Power Costs
 - 1. The Owner will pay for all costs of temporary electrical power for Items A.1, A.2, A.3, A.4, A.5 and A.6 used during construction.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain permits as required by local governmental authorities.
- B. Comply with National Electrical Code, and applicable local codes and utility regulations.

1.04 USE OF PERMANENT SYSTEM

- A. The permanent electrical system may be used for construction purposes to prevent interference with safety and orderly progress of the work.
- B. Leave permanent electrical services in a condition as good as new and clean.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General Materials
 - 1. The materials may be new or used, but must be adequate in capacity for the purposes intended and must not create unsafe conditions or violate the requirements of applicable codes.
 - 2. At the Contractor's option, patented specialty materials may be used if UL approved.
- B. Conductors
 - 1. Use wire, cable or busses of appropriate type, sized in accordance with the National Electrical Code for the applied loads.
 - 2. Use only UL approved wire.

2.02 EQUIPMENT

- A. Provide appropriate enclosures for the environment in which used in compliance with NEMA Standards.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all work with a neat and orderly appearance.
- B. Make structurally sound throughout.
- C. Maintain to give continuous service and to provide safe working conditions.
- D. Modify service as job progress requires.

3.02 INSTALLATION

- A. Provide all required facilities, including conductors, conduits, raceways, fuses, switches, fixtures and lamps.

3.03 REMOVAL

- A. Remove all temporary equipment and materials completely upon completion of construction.
- B. Repair all damage caused by the installation and restore to satisfactory condition.

* * * * *

SECTION 01 51 23

TEMPORARY HEATING, COOLING, AND VENTILATING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Requirements Specified Elsewhere
 - 1. Section 01 29 73 - Schedule of Values.
 - 2. Section 01 50 00 - Temporary Facilities.
 - 3. Section 01 51 13 - Temporary Electricity.
- B. Definitions
 - 1. Enclosed: A building shall be considered enclosed when the exterior walls and the roof are completed sufficiently to exclude the elements with permanent construction.

1.02 TEMPORARY HEAT

- A. Prior to the time a building is enclosed, temporary heat shall be provided by each Contractor, as required to accomplish the following:
 - 1. To protect their Work.
 - 2. To provide sufficient heat so that their personnel can accomplish the Work in accordance with the Contract Documents.
 - 3. To provide sufficient heat to maintain the construction schedule, as required by the Contract Documents.

1.03 PHASE I HEAT - BUILDING ENCLOSED - PERMANENT HEATING SYSTEMS NOT READY FOR OPERATION

- A. When a building is enclosed to the satisfaction of the Architect and Owner, the Mechanical Contractor shall provide heat when necessary to protect and accomplish the Work in accordance with the Contracts.
 - 1. Furnish, operate, and pay for a sufficient number of heating units until the permanent heating system is available and is in use.
 - 2. The Owner will pay for the LPG used.
 - 3. Furnish and operate heating units of an approved type. Units shall meet applicable laws, rules, and regulations.
 - 4. Vent units to the outside.
 - 5. Do not use electric heaters, open burning, or salamander type heating units.
 - 6. Maintain temperature between 45 degrees F and 55 degrees F, unless higher temperatures are required for the performance of and protection of the Work. Provide a minimum of three recording thermometers.
 - 7. Take precautions necessary to protect the Work from damage and to prevent hazardous conditions. Provide temporary combination carbon monoxide and smoke detectors throughout the duration of construction.
 - 8. Move, relocate, and adjust the heating units as required to protect the Work.
 - 9. Maintain strict supervision of operation of temporary heating and ventilating equipment.
 - a. Enforce conformance with applicable codes and standards.
 - b. Enforce safe practices.
 - c. Prevent abuse of services.
 - d. Prevent damage to finishes.

1.04 PHASE II HEAT - BUILDINGS ENCLOSED - PERMANENT HEATING SYSTEM OPERABLE

- A. When the permanent heating system is completed, and with the approval of the Architect and Owner, the permanent heating system may be used. The Mechanical Contractor is responsible for the operation and maintenance of the system.
- B. Each Contractor shall complete all Work necessary to receive heating elements or units and all other Work so that the equipment necessary for temporary heat can be installed.
- C. The Mechanical Contractor shall clean, maintain and replace fixtures, test, and otherwise prepare the permanent system for use for Phase II heat.
- D. The Plumbing Contractor shall furnish and maintain permanent or temporary water connections required for operation of equipment for temporary heat. The Plumbing Contractor shall bear the cost of providing and maintaining both permanent and temporary connections and removing temporary connections when no longer required.
- E. The Electrical Contractor shall furnish and maintain all permanent or temporary electric wiring required for operation of the permanent heating system. The Electrical Contractor shall bear the cost of providing and maintaining temporary and permanent wiring and removing temporary wiring when no longer required.

1.05 USE OF PERMANENT SYSTEM

- A. When the permanent heating system is used, the following shall be performed:
 - 1. The Mechanical Contractor shall place said system in perfect working order and in new condition (including filter replacements) prior to the Owner's acceptance of the project.
 - 2. Temporary filter fabric shall be installed on all system inlets. Fabric shall be changed when dirty. Provide a complete set of filters at substantial completion.
- B. The period of guarantee of the system will commence at the time of Substantial Completion.

1.06 VENTILATION

- A. General: Prevent hazardous accumulations of dust, fumes, mists, vapors, or gases in areas occupied during construction.
 - 1. Each Contractor shall provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas.
 - 2. Dispose of exhaust materials in a manner that will not result in harmful dispersal of hazardous substances into atmosphere of occupied areas.
 - 3. Ventilate storage spaces containing hazardous or volatile materials.
- B. Provide adequate ventilation for:
 - 1. Curing installed materials.
 - 2. Dispersal of humidity.
 - 3. Ventilation of temporary sanitary facilities.
- C. Duration of Operations
 - 1. For Personnel
 - a. At all times personnel occupy an area, when subject to hazardous accumulations of harmful elements.
 - b. Continue operation of ventilation and exhaust system for a time after cessation of work process to assure removal of harmful elements.
 - 2. For Curing Installed Materials: As required by specification section for respective materials.
 - 3. For Humidity Dispersal: As needed to provide suitable ambient conditions for work.

1.07 RESPONSIBILITY

- A. The Mechanical Contractor shall be responsible for damage during the period when Phase I and Phase II temporary heat is required by the Contract. The Mechanical Contractor shall be responsible for damage due to defective equipment or the use of said Contractor's equipment, including, but not limited to, damage such as stains, smudges, soot, or fire, shall repair or replace damaged material in a manner satisfactory to the Construction Manager and Owner.
- B. The Contractor or Contractor(s), causing delay in moving to the next heating phase, shall pay the remainder of the costs for heating, until the next heating phase starts. If more than one Contractor is responsible for delay, such cost shall be prorated as determined by the Architect.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations and procedures.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

PART 2 - PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the 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 Construction Manager.
- 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. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 2. Have longer documented life span under normal use.
 - 3. Result in less construction waste.
- C. 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.
- D. Cord and Plug: Provide minimum 6-foot (2 m) cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.03 ACCEPTABLE MANUFACTURERS

- A. Acceptable Manufacturers: The lists of manufacturers in the various sections are names of manufacturers believed to be capable of supplying one or more of the items specified in that section. The lists are not intended to limit competition, and products of other manufacturers may be submitted as equivalent products. The lists do not mean that every product of listed manufacturer is acceptable as meeting the specification requirements for quality.
- B. Products Specified by Performance, Reference Standards or Description Only: Use any product meeting those standards or description.
- C. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers listed and meeting all specifications, or an equivalent product. An equivalent product shall be defined as any product that meets all specified performance and aesthetic criteria but for which the manufacturer is not named. The Architect shall determine equivalency during the submittal review process.
- D. Substitutions: A substitution shall be defined as a product of a different composition but with similar performance characteristics. Example: the specifications call for a poured synthetic floor and the contractor proposes a rolled rubber floor in its place.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Substitutions will not be considered after Award of Contracts except as follows:
 - 1. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor because of strikes, lockouts, bankruptcies, or discontinuance of manufacturer.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution 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.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
 - 6. Contractor requesting substitution shall bear any additional costs to all parties due to his substitution.

- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 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.

3.03 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 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.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.

- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. 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

ATTACHMENT

SUBSTITUTION REQUEST



258 Genesee Street, Suite 300 • Utica, New York 13502
315.733.3344 • marchassoc.com

Contractor: _____

Address: _____

Phone: _____ Fax: _____

Date Requested: _____

Project: **OCDPW – Cornell Cooperative Extension, Addition & Alterations**
MARCH No: **23036**

REFERENCES:

SPEC. SECTION NO. _____ DRAWING NO(S): _____

PARAGRAPH _____ ROOM OR DET. NO(S): _____

This product is being proposed in lieu of _____
(NAME SPECIFIED PRODUCT)

PROPOSED SUBSTITUTION:

PRODUCT NAME: _____

MANUFACTURER: _____

ADDRESS: _____

☐ ACCEPTED	☐ ACCEPTED AS NOTED
☐ NOT ACCEPTED	☐ RECEIVED TOO LATE
☐ BID AS EQUIVALENT – WILL REVIEW AS SUBMITTAL	

Reviewed By: _____ Date: _____

Architects Remarks:

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Work Specified Elsewhere
 - 1. Section 01 11 00 - Summary of Work.
- B. Cutting and patching covers adjustments to, and necessary reworking of, elements of construction in both new and existing work. The following definitions for cutting and patching apply to this Contract.
 - 1. Cutting: Physical modification of construction work, both new and existing, or removal of existing or installed materials, including excavating and earthwork.
 - 2. Patching: Restoration or replacement and installation of construction material, both new and existing, including finishing, patching, excavations and compaction of backfilling. Each contractor is responsible for his own cutting and patching as required to perform his work.
- C. Execute cutting (including excavating), fitting or patching of work, required to:
 - 1. Make several parts fit properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and correct defective work.
 - 4. Remove and correct work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Install specified work in existing construction.
 - 7. Remove existing construction.
 - 8. Provide equipment, labor and incidentals necessary for cutting and patching as required for the installation of work in existing walls, floors and ceilings. Patching must match adjacent material and finish.
- D. Coordination
 - 1. Coordinate the installation of the Work to avoid cutting and patching in new construction.
- E. In addition to contract requirements, upon written instructions of the Construction Manager:
 - 1. Uncover work to provide for Construction Manager's observation of covered work.
 - 2. Remove samples of installed materials for testing.
 - 3. Remove work to provide for alterations of existing work.
- F. Do not endanger work by cutting or altering work or any part of it.

1.02 SUBMITTALS

- A. Prior to cutting which affects structural safety of project, submit written notice to the Construction Manager requesting consent to proceed with cutting, including:
 - 1. Identification of project.
 - 2. Description of affected work.
 - 3. Necessity for cutting.
 - 4. Effect on other work, on structural integrity of project.
 - 5. Description of proposed work. Designate:
 - a. Scope of cutting and patching.
 - b. Contractor and trades to execute work.
 - c. Products proposed to be used.
 - d. Extent of refinishing.
 - 6. Alternatives to cutting and patching.

7. Designation of party responsible for cost of cutting and patching.
- B. Should conditions of work, or schedule, indicate change of materials or methods, submit written recommendation to the Construction Manager, including:
 1. Conditions indicating change.
 2. Recommendations for alternative materials or methods.
 3. Submittals as required for substitutions.
- C. Submit written notice to the Construction Manager designating time work will be uncovered, to provide for observation.

1.03 PAYMENT FOR COSTS

- A. Costs caused by ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional service of Architect or Engineer will be paid for by the party responsible for ill-timed, rejected or non-conforming work.

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution as described in Section 01 60 00.

PART 3 - EXECUTION

3.01 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 contract 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 and patching means acceptable of existing conditions.

3.02 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.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. 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.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. 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, to full thickness of the penetrated element.
- I. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

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SECTION 01 74 01

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Requirements Specified Elsewhere
 - 1. Section 01 11 00 - Summary of Work.
- B. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- C. At completion of each work shift, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight exposed surfaces; leave areas adjacent to the work area clean and ready for occupancy.
- D. Remove all overspray caused by construction operations from adjacent construction, surfaces and vehicles.

1.02 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accord with safety and insurance standards.
- B. Hazards Control
 - 1. Store volatile wastes in covered metal containers and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Do not wash painting tools in sinks.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute daily cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials, dust and rubbish. The Contractor on site shall provide manpower on a daily basis to maintain adjacent work areas clean.
- B. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

3.02 FINAL CLEANING

- A. Each Contractor shall:
 - 1. Execute final cleaning prior to Substantial Completion.
 - a. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

2. Use cleaning materials that are nonhazardous.
3. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
4. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
5. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
6. Clean filters of operating equipment.
7. Clean debris from roofs and drainage systems.
8. Clean site; sweep paved areas, rake clean landscaped surfaces.
9. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
10. Clean Owner-occupied areas of work.

3.03 RUBBISH REMOVAL

- A. Each contractor shall comply with all Local, State & Federal Laws, Codes and Requirements regarding recycling and trash or rubbish removal.

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SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Requirements Specified Elsewhere
 - 1. Section 01 29 73 - Schedule of Values.
 - 2. Section 01 29 76 - Progress Payment Procedures.
 - 3. Section 01 74 01 - Cleaning.
 - 4. Section 01 78 39 - Project Record Documents.

1.02 SUBSTANTIAL COMPLETION

- A. Contractor:
 - 1. Submit written notice to the Architect that Project, or designated portion of Project, is Substantially Complete.
 - 2. Include in the notice a list of major items still to be completed.
- B. Architect will make an inspection within seven days after receipt of notice, together with the Construction Manager.
- C. Should Architect consider that Work is substantially complete:
 - 1. Architect shall prepare and issue a Certificate of Substantial Completion, AIA G704, complete with signatures of Owner and Contractor, accompanied by a list of items to be completed or corrected.
 - 2. Owner Occupancy of Project or Designated Portion of Project:
 - a. Contractor shall:
 - 1) Perform final cleaning in accordance with Section 01 74 01.
 - b. Owner will occupy Project, under provisions stated in Certificate of Substantial Completion.
 - 3. Contractor shall complete work listed for completion or correction within designated time.
- D. Should Architect consider that Work is not substantially complete:
 - 1. Architect shall immediately notify Contractor, in writing, stating reasons.
 - 2. Contractor shall complete Work and send second written notice to the Architect, certifying that Project, or designated portion of Project, is Substantially Complete.
 - 3. Architect will reinspect Work.

1.03 FINAL INSPECTION

- A. Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Project is completed and is in compliance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's Representative and are operational.
- B. The Architect will make final inspection within seven days after receipt of certification.
- C. Should Architect consider that Work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.
- D. Should the Architect consider that Work is not finally complete:
 - 1. The Architect shall notify Contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice to the Architect certifying that Work is complete.

3. The Architect will reinspect Work.

1.04 REINSPECTION COSTS

- A. Should the Architect be required to perform second inspections because of failure of the Work to comply with original certifications of the Contractor, the Owner will compensate the Architect or Engineer for additional services and deduct amount paid from final payment to Contractor.

1.05 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Section 01 78 39.
- B. Maintenance Materials: Conform to requirements of individual technical sections.
- C. Deliver evidence of compliance with requirements of governing authorities.
- D. Submit a notarized statement that only nonasbestos materials were installed on this project.
- E. Submit Contractor's written one year warranty from date of substantial completion.

1.06 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
- B. Contractor's Affidavit of Release of Liens: AIA G706A, with:
 1. Separate written releases of waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner, together with list of those parties.
 2. Contractor's written release or waiver of lien upon payment to the Contractor pursuant to New York State Lien Law.
- C. Consent of Surety to Final Payment: AIA G707.
- D. Submittals shall be duly executed before delivery to the Construction Manager.

1.07 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit final statement of accounting to Construction Manager.
- B. Statement shall reflect all adjustments.
 1. Original Contract Sum.
 2. Additions and deductions resulting from:
 - a. Previous Change Orders.
 - b. Other Adjustments.
 - c. Deductions for Uncorrected Work.
 - d. Deductions for Reinspection Payments.
 3. Total Contract Sum, as adjusted.
 4. Previous Payments.
 5. Sum remaining due.
- C. The Construction Manager will prepare a final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

1.08 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit final application in accordance with requirements of General and Supplementary Conditions. Refer to Section 01 29 76.

1.09 FINAL CERTIFICATION FOR PAYMENT

- A. The Architect will issue final certificate in accordance with provisions of the General Conditions.
- B. Should final completion be materially delayed through no fault of Contractor, the Architect may issue a Semi-Final Certificate for Payment, in accordance with provisions of General Conditions.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

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SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Requirements Specified Elsewhere
 - 1. Section 01 30 00 - Administrative Requirements.
 - 2. Technical Specifications: All requirements for warranty and maintenance data.

1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain, at job site, one copy of:
 - 1. Contract Drawings
 - 2. Project Manual
 - 3. Addenda
 - 4. Approved Shop Drawings, Product Data and Samples
 - 5. Supplemental Instructions
 - 6. Change Orders
 - 7. Other Modifications to Contract
 - 8. Field Test Records
 - 9. Correspondence File
- B. Store documents in approved locations, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry, legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Architect and Owner.
- G. File documents in accordance with Table of Contents of the Project Manual.

1.03 MARKING DEVICES

- A. Provide felt marking pen for marking, conforming to following color code:
 - 1. Red for General Construction Work.
 - 2. Green for Plumbing / Mechanical Work.
 - 3. Blue for Electrical Work.
 - 4. Black for all other written notations.

1.04 RECORDING

- A. Label each document "PROJECT RECORD" in 2 inch high printed letters.
- B. Keep record documents current.
- C. Contract Drawings: Legibly mark to record actual construction as follows:
 - 1. Field changes of dimension and detail.
 - 2. Changes made by Supplemental Instructions or Change Order.
 - 3. Details not on original Contract Drawings.
- D. Specifications and Addenda
 - 1. Legibly mark-up each section to record:

- a. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
 - b. Changes made by Supplemental Instructions or Change Order.
 - c. Other matters not originally specified.
- E. Shop Drawings, Product Data, and Samples: Maintain as record documents. Legibly mark-up approved submittals to show changes made after review.

1.05 SUBMITTAL

- A. At the completion of project, deliver all record and warranty documents to the Architect.
- B. Submit two (2) sets of "Project Record Documents" (Submittals (data/shop drawings), sketches, change orders, etc.) in a three-ring binder; Submit two (2) sets of "Operation & Maintenance Documents" (operation, maintenance data, and warranties) in a three-ring binder; (2) sets of as-built record drawings (all disciplines); and (2) thumb drives containing scanned pdf files of the contents of all the record/O&M/warranty binders and record drawings. Clearly label the Binders, Drawings, and CD: "Cornell Cooperative Extension, Addition & Alterations - Record Documents" along with the Contractors name, date, and MARCH Project No. 23036.
- B. Accompany submittal with transmittal letter, in duplicate containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Certification that each document as submitted is complete and accurate
 - 6. Signature of Contractor, or his authorized representative

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
 - 1. Footings, Foundation and Building Walls.
 - 2. Slabs-on-grade as indicated on the structural drawings.
 - 3. Elevated Concrete Floor slabs as indicated on the structural drawings.
 - 4. In-fill of openings / recesses in Concrete Floor Slabs.
 - 5. Concrete for Equipment Bases and Curbs to be supplied and installed by Trade involved using concrete as specified in this section.
 - 6. Expanded Polystyrene (EPS) Geofoam (if applicable to the Project for support of in-fill concrete slab).
- B. Related Sections include the followings:
 - 1. Division 1 Section 01 45 33 "Code-Required Special Inspections and Procedures" for independent testing agency procedures and administrative requirements.
 - 2. Division 3 Section "Concrete Floor Finishes" for general requirements for concrete floor finishes, applications, cure-seal-hardener requirements and general coating application requirements.
 - 3. Division 9 Section "Concrete Floor Treatment" for general requirements for concrete floor treatment.

1.03 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.
- B. Expanded Polystyrene (EPS) Geofoam: As shown on drawings for support of in-fill concrete slabs, structurally sufficient to support weight of plastic concrete and other superimposed loads. Reference ASTM D6817 – Standard Specification for Rigid, Cellular Polystyrene Geofoam.

1.04 SUBMITTALS

- A. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate some portion of the work showing fabrication, layout, setting or erection details.

Refer to Division 1, Section 01 30 00 - "Administrative Requirements" and information within this section for additional submittal requirements.

1. Identify details by reference to sheet and detail numbers shown on shop drawings.
 2. Sheet size, multiple of 8 ½ by 11 inches, not to exceed size of contract drawings when unfolded.
 3. **Photographic reproductions of contract drawings will NOT be accepted as shop drawings and will be REJECTED without review.**
- B. Portable Document Format (PDF) Files: All submittals required for this section (including, but not limited to, Product Data, Design Mixes, Shop Drawings, Qualification Data, Material Test Reports and Material Certificates) shall be submitted to the A/E in "PDF" electronic format.
- C. Product Data: For each type of product indicated.
- D. Design Mixtures: Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
1. Indicate amounts of mixing water to be withheld for later addition at Project site.
 2. **Please note: The proposed mix design submittals shall include the use of the specified maximum Coarse-Aggregate Size and the supporting data submitted for mix design approval shall include appropriate documentation using the specified materials in accordance with ACI requirements. Submitting quantities of materials to be used for proposed design mix alone without the appropriate supporting data as required by ACI will not be sufficient for approval and will not be reviewed. If the proposed supplier does not have sufficient supporting data as required by ACI, the Contractor shall allow appropriate time in their schedule to have the required laboratory trial mixture testing performed so that information can be included in the submittal.**
- E. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include plans and elevations of all reinforced concrete and masonry building elements (including, but not limited to walls, piers, footings, structural framing beams / girders / slabs) and shall include (as a minimum) bar sizes, lengths, material grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. **NOTE: All reinforcing steel shall be supplied and detailed in U.S. Standard sizes. Metric units will not be accepted and will be rejected.**
- F. Samples: For vapor retarder / barrier.
- G. Qualification Data: For manufacturer and testing agency.
- H. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
1. Aggregates.

- I. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Curing compounds.
 - 6. Floor and slab treatments.
 - 7. Vapor retarder / barrier.
 - 8. Joint-filler strips.
 - 9. Repair materials.
- J. Construction and Contraction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the A/E. If joint locations are shown on documents, they are intended to provide the Contractor with the general intent of where joints are proposed to be placed. The Contractor shall review the proposed locations and shall submit their proposed placement drawing of all joints for review and comment prior to placement.
- K. Floor surface flatness and levelness requirements to determine compliance with specified tolerances.
- L. Field quality-control test and inspection reports.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

- B. Expanded Polystyrene (EPS) Geofoam: Deliver, store, and handle in accordance with the Manufacturer's requirements to prevent damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.02 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Expanded Polystyrene (EPS) Geofoam: As shown on drawings for support of in-fill concrete slabs, structurally sufficient to support weight of plastic concrete and other superimposed loads. Reference ASTM D6817 – Standard Specification for Rigid, Cellular Polystyrene Geofoam.
 - 1. Basis of Design: Foam Control Geofoam Type EPS12 or approved equal.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.03 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed bars, epoxy coated, ASTM A 775/A 775 M or ASTM A 934/A 934 M, with less than 2 percent damaged coating in each 12-inch bar length.
- C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- D. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A, Type 1 coated, plain-steel wire, with less than 2 percent damaged coating in each 12-inch wire length.
- E. Plain-Steel Wire: ASTM A 82, as drawn.
- F. Deformed-Steel Wire: ASTM A 496.
- G. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- H. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- I. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A coated, Type 1, plain steel as-fabricated into flat sheets.
- J. **NOTE: All reinforcing steel shall be supplied and detailed in U.S. Standard sizes. Metric units will not be accepted and will be rejected.**

2.04 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Epoxy-coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, ASTM A 775/A 775M epoxy coated.
- C. Epoxy Repair coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.05 CONCRETE MATERIALS

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

1. Portland Cement: ASTM C 150, Type I/II, gray or white.
 2. **Use of Fly Ash, Slag Cement, Blended Hydraulic Cement and Silica fume are NOT permitted.**
- B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
1. Maximum Coarse-Aggregate Size: **3/4 inch nominal**.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.06 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.07 WATERSTOP

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
1. Available Manufacturers:
 - a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
 - b. Concrete Sealants Inc.; Conseal CS-231.
 - c. Greenstreak; Swellstop.
 - d. Henry Company, Sealants Division; Hydro-Flex.
 - e. JP Specialties, Inc.; Earthshield Type 20.
 - f. Progress Unlimited, Inc.; Superstop.
 - g. TCMiraDRI; Mirastop

2.08 VAPOR RETARDERS / BARRIERS

- A. Underslab Vapor Retarder / Barrier: 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.**

Maintain permeance of less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).

- B. Installation: Comply with ASTM E1643.

1. Note: The Vapor Retarder / Barrier shall be sealed to the foundation walls.
- C. Accessory Products: Vapor Retarder / Barrier manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in Vapor Retarder / Barrier.
- D. Approved Manufacturers / Products:
 - a. Fortifiber Building Systems Group; Moistop Ultra 15: www.fortifiber.com.
 - b. Layfield Construction Products; Vaporflex 15: www.layfieldgroup.com.
 - c. Stego Industries, LLC; [Stego Wrap Vapor Barrier (15-mil)]: www.stegoindustries.com
 - d. ISI Building Products: Viper VaporCheck II 15 Mil: www.insulationsolutions.com.
 - e. No Substitutions.

2.09 FLOOR AND SLAB TREATMENT

- A. Refer to Division 9 Section "Concrete Floor Treatment" for general requirements for concrete floor treatment.
- B. Coordinate all special requirements for concrete floor treatments with the Architectural drawings and Architectural Requirements.

2.10 CONCRETE FLOOR FINISHES

- A. Refer to Division 3 Section "Concrete Floor Finishes" and the Architectural drawings for general requirements for concrete floor finishes, applications, cure-seal-hardener requirements and general coating application requirements.

2.11 CURING MATERIALS

- A. General: Contractor shall coordinate the compatibility of all curing means, methods and materials / products with the floor surface finish and floor covering materials requirements, including the floor covering adhesives.
- B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- D. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- E. Water: Potable.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

- H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.12 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Reglets: Fabricate reglets of not less than 0.0217-inch-thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- E. Expanded Polystyrene (EPS) Geofoam: As shown on drawings for support of in-fill concrete slabs, structurally sufficient to support weight of plastic concrete and other superimposed loads. Reference ASTM D6817 – Standard Specification for Rigid, Cellular Polystyrene Geofoam.
1. Basis of Design: Foam Control Geofoam Type EPS12 or approved equal.

2.13 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.14 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - 2. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 3. **Please note: The proposed mix design submittals shall include the use of the specified maximum Coarse-Aggregate Size and the supporting data submitted for mix design approval shall include appropriate documentation using the specified materials in accordance with ACI requirements. Submitting quantities of materials to be used for proposed design mix alone without the appropriate supporting data as required by ACI will not be sufficient for approval and will not be reviewed. If the proposed supplier does not have sufficient supporting data as required by ACI, the Contractor shall allow appropriate time in their schedule to have the required laboratory trial mixture testing performed so that information can be included in the submittal.**
- B. **Use of Fly Ash, Slag Cement, Blended Hydraulic Cement and Silica fume are NOT permitted in concrete mix designs.**
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.15 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings (including footings supporting Frost Walls) and Interior Foundation Walls: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4000 psi at 28 days.
 - 2. Minimum Cementitious Materials Content: 540 lb/cu. yd
 - 3. Maximum Water-Cementitious Materials Ratio: 0.45.
 - 4. Slump Limit: 4 inches (or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture), plus or minus 1 inch.
 - 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
 - 6. **Please note that mix design shall include the specified maximum Coarse-Aggregate Size and the supporting data submitted for mix design approval shall include appropriate documentation using the specified materials in accordance with ACI requirements as indicated in Article 1.04, "SUBMITTALS" and Article 2.14, "CONCRETE MIXTURES, GENERAL".**

- B. Interior Slabs-on-Grade as shown on structural drawings, In-fill of Openings in Interior Slabs-on-grade indicated on the structural drawings and Concrete for Interior Equipment Bases and Curbs: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 540 lb/cu. yd.
 3. Maximum Water-Cementitious Materials Ratio: 0.45
 4. Slump Limit: 4 inches, plus or minus 1 inch.
 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size. NOTE: Do not allow air content of troweled finished floors to exceed 3 percent.
 6. **Please note that mix design shall include the specified maximum Coarse-Aggregate Size and the supporting data submitted for mix design approval shall include appropriate documentation using the specified materials in accordance with ACI requirements as indicated in Article 1.04, "SUBMITTALS" and Article 2.14, "CONCRETE MIXTURES, GENERAL".**
- C. Foundation and Building Walls (including Frost Walls), exterior apron slabs-on-grade at overhead doors, exterior slabs-on-grade and frost walls at exterior doors, haunched slabs and exterior ramps / stairs / pads shown on the structural drawings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4500 psi at 28 days.
 2. Minimum Cementitious Materials Content: 540 lb/cu. yd.
 3. Maximum Water-Cementitious Materials Ratio: 0.45
 4. Slump Limit: 4 inches, plus or minus 1 inch.
 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size. NOTE: Do not allow air content of troweled finished floors to exceed 3 percent.
 6. **Please note that mix design shall include the specified maximum Coarse-Aggregate Size and the supporting data submitted for mix design approval shall include appropriate documentation using the specified materials in accordance with ACI requirements as indicated in Article 1.04, "SUBMITTALS" and Article 2.14, "CONCRETE MIXTURES, GENERAL".**
- D. Elevated Concrete Slabs-on-Steel Deck (as shown on structural drawings), In-fill of openings in Elevated Concrete slabs and Concrete Toppings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 540 lb/cu. yd.
 3. Maximum Water-Cementitious Materials Ratio: 0.45
 4. Slump Limit: 4 inches, plus or minus 1 inch.
 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size. NOTE: Do not allow air content of troweled finished floors to exceed 3 percent.
 6. **Please note that mix design shall include the specified maximum Coarse-Aggregate Size and the supporting data submitted for mix design approval shall include appropriate documentation using the specified materials in accordance with ACI requirements as indicated in Article 1.04, "SUBMITTALS" and Article 2.14, "CONCRETE MIXTURES, GENERAL".**

2.16 FABRICATING REINFORCEMENT

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

2.17 CONCRETE MIXING

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

PART 3 - EXECUTION

3.01 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class C, 1/2 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- M. Expanded Polystyrene (EPS) Geofoam: If required and as shown on structural drawings for support of in-fill concrete slabs, structurally sufficient to support weight of plastic concrete and other superimposed loads. Reference ASTM D6817 – Standard Specification for Rigid, Cellular Polystyrene Geofoam. Install in accordance with manufacture's written requirements.

In areas where portions of Expanded Polystyrene (EPS) Geofoam has been removed to accommodate installation of under-slab utilities, the voids created shall be infilled prior to slab placement with "Controlled Low-Strength Material" (Low-density, self-compacting, flowable concrete material) as specified and in accordance with Specification Section 312000 - "Building Earth Moving", Article 2.03 "Controlled Low-Strength Material" or with approved alternate materials and / or methods.

3.02 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated or as required.

3.03 REMOVING AND REUSING FORMS

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

3.04 VAPOR RETARDERS / BARRIERS

- A. Plastic Vapor Retarders / Barriers: Place, protect, and repair vapor retarders / barriers according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Unroll the vapor retarder / barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.

2. Extend the vapor retarder / barrier to the perimeter of the slab. If practicable, terminate the vapor retarder / barrier at the top of the slab, otherwise (a) at a point acceptable to the Architect / Engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor retarder / vapor barrier.

At the point of termination, seal the vapor retarder / barrier to the foundation wall, grade beam or slab itself.

Please Note: The perimeter seal can be handled several ways depending on the selected / approved product manufacturer and their proprietary sealing material and / sealing devices specifically intended for this application / use. The Contractor shall submit all products to be used to the A/E for approval prior to installation.

- a. Seal the vapor retarder / barrier to the entire slab perimeter using the selected & approved product manufacturer's proprietary sealing material and / or sealing devices specifically intended for this application / use. Installation shall be in accordance with ASTM E 1643 and manufacturer's written instructions.
 - b. Seal vapor retarder / barrier to the entire perimeter wall or footing/grade beam using the selected / approved product manufacturer's proprietary sealing material and / or sealing devices specifically intended for this application / use. Installation shall be in accordance with ASTM E 1643 and manufacturer's written instructions. Ensure the concrete is clean and dry prior to adhering tape.
3. Overlap joints 6 inches and seal with manufacturer's seam tape.
 4. Apply seam tape or other sealing material / devices to a clean and dry vapor barrier.
 5. Seal all penetrations (including pipes) per manufacturer's instructions.
 6. Avoid the use of non-permanent stakes driven through vapor barrier to the greatest extent possible.

However, if non-permanent stakes are driven through the vapor retarder / barrier, repair as recommended by vapor barrier manufacturer.
 7. Repair all damaged areas with vapor retarder / barrier material of similar (or better) permeance, puncture and tensile properties.

3.05 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Epoxy-coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

3.06 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the A/E. If shown on the Documents, the Joint locations shown are intended to provide the Contractor with the general intent of where joints are proposed to be placed. The Contractor shall review the proposed locations if shown and shall submit their proposed placement drawing of all joints for review and comment prior to placement.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - 3. If shown on the Documents, the Joint locations shown are intended to provide the Contractor with the general intent of where joints are proposed to be placed. The Contractor shall review the proposed locations if shown and shall submit their proposed placement drawing of all joints for review and comment prior to placement.
- D. Isolation Joints and / or Voids left in Slabs-on-Grade or in concrete walls / piers: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
 - 3. All voids left in concrete walls, piers, etc. that allow for installation of columns or other embedded items shall be infilled with concrete after installation of these items, regardless of whether or not this is indicated on the drawings.

3.07 WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.08 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.09 FINISHING FORMED SURFACES

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

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.
 - 1. Apply scratch finish to surfaces indicated, to those to receive concrete floor toppings and to those to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated, to those to receive trowel finish, to those to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or to those to receive sand bedded terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. For floor slabs greater than 10,000 sq. ft., surface plan tolerances shall be measured by the F-number system listed below. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Non-critical Floors Slabs (mechanical rooms, non-public areas, subfloors under concrete toppings, thick-set tile, sand bed terrazzo and raised computer floors): Specified overall values of flatness (SOV), F(F) 20; and of levelness, F(L) 15; with minimum local values of flatness (MLV), F(F) 15; and of levelness, F(L) 10.
 - b. Carpeted Floor Slabs: Specified overall values of flatness (SOV), F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness (MLV), F(F) 17; and of levelness, F(L) 15.
 - c. Slabs-on-Grade with Thin-set Floor Coverings and Resilient Floor coverings: Specified overall values of flatness (SOV), F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness (MLV), F(F) 24; and of levelness, F(L) 17.
 - d. Elevated Floor Slabs with Thin-set Floor Coverings and Resilient Floor Coverings: Specified overall values of flatness (SOV), F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness (MLV), F(F) 24; and of levelness, F(L) 15.
 - e. Very Flat Floors with better than average flatness and levelness requirements (only for areas specifically noted on drawings as "Very Flat Floors"): Specified overall values of flatness (SOV), F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness (MLV), F(F) 30; and of levelness, F(L) 24.

For elevated cast-in-place concrete floor slab construction, these tolerances are to be achieved before removal of any supporting shores.

For elevated concrete floor slabs on metal deck, these tolerances for overall flatness and levelness do not apply.

3. For floor slabs less than 10,000 sq. ft., surface plan tolerances shall be finished and measured by the "straightedge method" in-lieu of the F-number system listed above. Finish and measure concrete surfaces such that the gap at any point between the concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch.
 4. **For all floor slabs to receive a wooden floor system or other specialty floor systems, the floor finish and surface plan tolerances, flatness and levelness shall be in accordance with the manufacturer's requirements. The General Contractor shall be responsible for performing all necessary testing to certify in writing that the manufacturer's requirements are met in their entirety prior to the installation of the floor system. If it is found that any of these requirements are not in compliance, the General Contractor is responsible for all repairs or corrections required to certify that the manufacturer's requirements are met prior to the installation of the floor system.**
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
1. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aggregate over surface in 1 or 2 applications. Tamp aggregate flush with surface, but do not force below surface.
 2. After broadcasting and tamping, apply float finish.
 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.
- H. Refer to Division 9 Section "Concrete Floor Treatment" for general requirements for concrete floor treatment.
- I. Refer to Division 3 Section "Concrete Floor Finishes" for general requirements for concrete floor finishes, applications, cure-seal-hardener requirements and general coating application requirements.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes, voids, openings, etc. left in concrete structures, unless otherwise indicated to be left open, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.
- E. Expanded Polystyrene (EPS) Geofoam: If required and as shown on structural drawings for support of in-fill concrete slabs, structurally sufficient to support weight of plastic concrete and other superimposed loads. Reference ASTM D6817 – Standard Specification for Rigid, Cellular Polystyrene Geofoam. Install in accordance with manufacture's written requirements.

In areas where portions of Expanded Polystyrene (EPS) Geofoam has been removed to accommodate installation of under-slab utilities, the voids created shall be infilled prior to slab placement with "Controlled Low-Strength Material" (Low-density, self-compacting, flowable concrete material) as specified and in accordance with Specification Section 312000 - "Building Earth Moving", Article 2.03 "Controlled Low-Strength Material" or with approved alternate materials and / or methods.

3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

- a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
- 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive concrete stain.
 - b. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
- 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
- F. Refer to Division 9 Section "Concrete Floor Treatment" for general requirements for concrete floor treatment.
- G. Refer to Division 3 Section "Concrete Floor Finishes" for general requirements for concrete floor finishes, applications, cure-seal-hardener requirements and general coating application requirements.

3.13 JOINT FILLING

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

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Refer to Section 01 45 33 "Code-Required Special Inspections and Procedures" for additional information.
- B. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Headed bolts and studs.
 - 3. Verification of use of required design mixture.
 - 4. Concrete placement, including conveying and depositing.
 - 5. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 - 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 9. Test results shall be reported in writing to the Owners' on-site Representative or Agent, the Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 13. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION

SECTION 03 35 11
CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface treatments for concrete floors and slabs.
- B. Liquid densifiers and hardeners.
- C. Concrete stains and dyes.
- D. Polished concrete.

1.02 REFERENCE STANDARDS

- A. ACI 302.1R Guide for Concrete Floor and Slab Construction.
- B. ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry.
- C. NFSI Test Method 101-A Standard for Evaluating High-Traction Flooring Materials, Coatings, and Finishes.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with concrete floor placement and concrete floor curing.
- B. Pre-Installation Conference:
 - 1. At least two weeks prior to commencing the work of this Section, conduct a pre-installation conference at the project site.
 - 2. Agenda:
 - 3. Scheduling of polishing operations.
 - a. Review of material storage locations.
 - b. Coordination of work by other trades.
 - c. Installation procedures for ancillary equipment.
 - d. Protection of completed work.
 - e. Establish weather and working temperature conditions to which Architect and Contractor must agree.
 - f. Discuss process for manufacturer's inspection and acceptance of completed work of this Section.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: 1/4" scale plans of layout including dimensions, floor grinding schedule, joint pattern layout and areas to receive colored surface treatments.
- C. Product Data: Manufacturer's published data and installation instructions for concrete polishing system and finishing products, including manufacturer's installation instructions, information on compatibility of different products, and limitations.
- D. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.05 MOCK-UP

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Mock-Up Size: 10 feet square.
- C. Locate where directed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.07 FIELD CONDITIONS

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F minimum.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 10-year manufacturer warranty against excessive degradation of finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 CONCRETE FLOOR FINISH APPLICATIONS

- A. Polished Finish:
 - 1. Use at following locations: New first floor slabs. Refer to floor plans and Room Finish Schedule for locations.

2.02 DENSIFIERS AND HARDENERS

- A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores, hardening, and dustproofing.
 - 1. Abrasion Resistance to Revolving Disks: At least a 32.5 percent improvement over untreated samples when tested in accordance with ASTM C779.
 - 2. Surface Adhesion: At least a 22 percent increase in adhesion for epoxy when tested in accordance with ASTM D3359.
 - 3. Hardening: As follows when tested in accordance with ASTM C39:
 - a. After 7 days: An increase of at least 40 percent over untreated samples.
 - b. After 28 days: An increase of at least 38 percent over untreated samples.
 - 4. Coefficient of Friction: 0.86 dry, 0.69 wet when tested in accordance with ASTM C1028.
 - 5. Rebound Number: An increase of at least 13.3% over untreated samples when tested in accordance with ASTM C805.
 - 6. Light Exposure Degradation: No evidence of adverse effects on treated samples when tested in accordance with ASTM G23.
 - 7. Composition: Lithium silicate.
 - 8. Products:
 - a. PROSOCO, Inc; Consolideck LS: www.prosoco.com/consolideck.

2.03 COATINGS

- A. Concrete Stain or Dye: Translucent, penetrating compound for interior or exterior use; must be finished with a topical sealer.
 - 1. Number of Coats: Minimum of two.
 - 2. VOC: 100 g/L or less.
 - 3. Primary Color: As selected, in a formulation to match approved mock-up.
 - 4. Secondary Color: As selected, applied after primary color has completely dried, in a formulation to match approved mock-up.
 - 5. Composition: Water-based, nonreactive.
 - a. Products:
 - 1) PROSOCO, Inc; GemTone Stain: www.prosoco.com/consolideck.
- B. High Gloss Clear Coating: Transparent, nonyellowing, acrylic polymer-based coating.
 - 1. Composition: Solvent-based.
 - 2. Products:
 - a. PROSOCO, Inc; PolishGuard: www.prosoco.com/consolideck.

2.04 POLISHED CONCRETE SYSTEM

- A. Polished Concrete System: Materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified sheen.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.02 PREPARATION

- A. Exercise reasonable care and precautions to protect surrounding materials and finishes against undue soilage and damage. Clean or repair all existing surfaces which are soiled or otherwise damaged by work of this Section, to match indicated profiles and specified finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.
- B. Examine surface to determine soundness of concrete for polishing.
- C. Concrete shall be mechanically prepared to achieve a concrete surface profile (CSP) 3 in accordance with ICRI standards.

3.03 GENERAL

- A. Apply materials in accordance with manufacturer's instructions and recommendations.

3.04 INSTALLATION

- A. Floor surface polishing and treatment:
 - 1. Provide polished concrete floor treatment for all areas indicated on the Drawings. Provide consistent finish in all contiguous areas.
 - 2. Apply floor finish prior to installation of fixtures and accessories.
 - 3. Diamond polish concrete floor surface with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit using dry method.
 - a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Level of sheen shall match that of approved mock-up.
 - b. Expose aggregate in concrete surface only as determined by approved mock-up.
 - c. All concrete surfaces shall be as uniform in appearance as possible.
 - 4. Apply hardener/densifier and sealers as recommended by manufacturer.
 - a. Follow manufacturer's recommendations for drying time between successive coats.
 - 5. Remove defects and repolish defective areas.
 - 6. Comply with NFSI Test Method 101-A Phase Two Level High Traction Material.
 - 7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.05 CONCRETE POLISHING

- A. Execute using materials, equipment, and procedures specified by manufacturer, using manufacturer approved installer.
 - 1. Final Polished Sheen: High-gloss finish; other sheens are included as comparison to illustrate required sheen; final sheen is before addition of any sealer or coating, regardless of whether that is also specified or not.
 - 2. High Gloss Finish: Finish that looks wet and shows mirror-like reflections of side and overhead images.

3.06 PROTECTION

- A. Protect finished surface as required and as recommended by manufacturer of polishing system.

END OF SECTION

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**SECTION 04 20 00
UNIT MASONRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete block.
- B. Mortar.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Accessories.

1.02 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2022.
- C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- D. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.
- E. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- F. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.
- G. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- H. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.
- I. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata.

1.03 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. Samples: Submit two samples of decorative block units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- 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. Extra Decorative Block Units: 20 of each type, size and color.

1.04 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum 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.

1.05 MOCK-UPS

- A. Construct a masonry wall as a mock-up panel sized 4 feet long by 4 feet 8 inches high; include mortar, accessories, reinforcement, flashings (with lap joint, corner, and end dam), weather barrier, and wall insulation in mock-up.

- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Split-face Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 4 inches.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners, control joint edges, and other detailed conditions.
 - a. Provide 8 inch return at units for outside corners.
 - 3. Face: Textured, broken rock face appearance with rough and rugged texture.
 - 4. Nonloadbearing Units: ASTM C129.
 - a. Solid block, as indicated.
 - b. Lightweight.
 - 5. Color: As selected by Architect from manufacturers full line.

2.02 MORTAR MATERIALS

- 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 N.
 - 2. Color: Mineral pigments added as required to produce approved color sample.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Hohmann & Barnard, Inc: www.h-b.com.
 - 2. WIRE-BOND www.wirebond.com.
- B. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- C. 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 1 1/4 inches.

2.04 FLASHINGS

- A. Flexible Flashing with Elvaloy KEE: Solid-phase plasticizer added to membrane flashing.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc.; Flex-Flash Flashing: www.h-b.com.
- B. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
- C. Termination Bars: Stainless steel; compatible with membrane and adhesives.
- D. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
 - 1. Manufacturers:

- a. Hohmann & Barnard, Inc: www.h-b.com.

2.05 ACCESSORIES

- A. 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.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Advanced Building Products Inc; Mortar Break: www.advancedbuildingproducts.com.
 - 2) Mortar Net Solutions; MortarNet: www.mortarnet.com.
- B. Weeps:
 - 1. Type: Molded PVC grilles, insect resistant.
- C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 MORTAR MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Exterior, non-loadbearing masonry: Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

PART 3 EXECUTION

3.01 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.

3.02 COLD AND HOT WEATHER REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.03 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. Mortar Joints: Concave.

3.04 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners, except for units laid in stack bond.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.05 WEEPS/CAVITY VENTS

- A. Install weeps in veneer walls at 32 inches on center horizontally on top of through-wall flashing at bottom of walls.

3.06 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. 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.

3.07 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. 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.

3.08 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.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - 1. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
 - 2. Anchor vertical leg of flashing into backing with a termination bar and sealant.
- C. Install flashing in accordance with manufacturer's instructions.
- D. Extend flexible flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- E. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.09 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Size control joints as indicated on drawings; if not indicated, 3/8 inch wide and deep.
- C. Locate control joints as shown on drawings.
- D. Form expansion joint as detailed on drawings.

3.10 BUILT-IN WORK

- A. As work progresses, install built-in window 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.

3.11 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- D. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- E. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

- A. Cut and fit for pipes, conduit, and sleeves. 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.

3.13 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

3.14 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

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SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Structural steel.
 - 2. Shop- and Field-installed shear connectors.
 - 3. Grout.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 45 33 "Code-Required Special Inspections and Procedures" for independent testing agency procedures and administrative requirements.
 - 2. Division 5 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
 - 3. Division 9 painting Sections for surface preparation and priming requirements.

1.03 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.04 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.
 - 2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer licensed in the State of New York to prepare structural analysis data for structural-steel connections. Refer to Article 1.5 (SUBMITTALS), Paragraph D.5 for Submittal Requirements.
- B. Construction: Type 2, simple framing, unless otherwise indicated on the drawings.

1.05 SUBMITTALS

- A. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate some portion of the work showing fabrication, layout, setting or erection details.

Refer to Division 1, Section 01 30 00 - "Administrative Requirements" and information within this section for additional submittal requirements.

1. Identify details by reference to sheet and detail numbers shown on shop drawings.
 2. Sheet size, multiple of 8 ½ by 11 inches, not to exceed size of contract drawings when unfolded.
 3. **Photographic reproductions of contract drawings will NOT be accepted as shop drawings and will be REJECTED without review**
- B. Portable Document Format (PDF) Files: All submittals required for this section (including, but not limited to, Product Data, Shop Drawings, Welding Certificates, Qualification Data, and Mill Test Reports) shall be submitted to the A/E in "PDF" electronic format.
- C. Product Data: For each type of product indicated.
- D. Shop Drawings: Show fabrication of structural-steel components.
1. Include Anchor Rod and Base Plate / Leveling Plate Erection Drawings, Embedment Drawings, Structural Steel Framing Erection Drawings and associated individual member detail sheets for review and approval prior to start of fabrication.

It is acceptable for the initial review submittal to include the Anchor Rod and Base Plate / Leveling Plate Erection Drawings, Embedment Drawings and Structural Steel Framing Erection Drawings without the associated individual member detail sheets.

However, fabrication shall not begin until all required shop drawings have been submitted, reviewed and approved. Other than the initial submittal, submission of erection drawings alone without the accompanying individual member detail sheets is not acceptable.
 2. Include details of cuts, connections, shop- and field-installed shear connectors, splices, camber, holes, and other pertinent data.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 5. For all structural-steel connections, include structural analysis data, shop standard connections with load carrying capacities, and other pertinent data that has been signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.
- E. Welding certificates.
- F. Qualification Data: For Installer, fabricator and testing agency.

- G. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Shop primers.
 - 4. Non-shrink grout.
- H. Source quality-control test reports.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who has completed comparable projects.
- B. Fabricator Qualifications: A qualified fabricator who has completed comparable projects.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.08 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles, M-Shapes, S-Shapes: ASTM A 36/A 36M.

- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 - 1. Weight Class: Standard unless otherwise indicated on the drawings.
 - 2. Finish: Black, except where indicated to be galvanized.
- F. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Plain.
- B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- C. Headed Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Configuration: Straight, unless otherwise shown on the drawings.
 - 2. Nuts: ASTM A 563 heavy hex carbon steel.
 - 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 4. Washers: ASTM F 436 hardened carbon steel.
 - 5. Finish: Plain.

2.03 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer. Coordinate primer selection with surface preparation and topcoat requirements.
- B. Galvanizing Repair Paint: ASTM A 780.

2.04 GROUT

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 1. Camber structural-steel members where indicated.
 - 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning", unless otherwise noted on the drawings or as required by the selected primer, paint or coating system requirements. The more stringent requirements shall apply.
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.06 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, unless otherwise noted on the drawings.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

2.07 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials.
 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the specifications, standards and requirements of the selected primers, paint or coating system.
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
- D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.08 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
 1. Fill vent holes and grind smooth after galvanizing.
 2. **Galvanize lintels and shelf angles located in exterior walls and in damp locations.**
 3. **Galvanize miscellaneous framing and supports in the following locations:**
 - a. Exterior locations.
 - b. Interior locations in damp locations and where indicated, such as, but not limited to embedded angles, frames and plates at drains.
 4. Refer to Contract drawings for other materials and pieces to be galvanized.

2.09 PREFORMED JOINT MATERIAL

- A. Provide closed cell polyethylene expansion joint material equal to the following manufacturers:
 1. "Sonoflex F" as manufactured by BASF, The Chemical Company.
 2. "Deck-O-Foam" as manufactured by W. R. Meadows, Inc.

2.10 SOURCE QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage an independent special inspector and qualified testing and inspecting agency to perform shop tests and inspections and

prepare test reports. Refer to Section 01 45 33 "Code-Required Special Inspections and Procedures" for additional information.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: If required, shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: As a minimum, all welded connections will be visually inspected. If the results of the visual inspections indicate that the quality of the welds do not meet the minimum AWS standards and requirements, or show signs of specific concern, the affected shop-welded connections will be tested and inspected according to AWS D1.1 in accordance of one or more of the following inspection procedures as applicable. The selected testing method(s) will be at the testing agency's option that best suits the conditions or concern.
 1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor is required to field verify elevations of concrete and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, with an instrument survey for compliance with requirements.
- B. Prior to fabrication, the Contractor will verify existing dimensions and conditions prior to fabrication of all affected structural steel.
- C. Prior to fabrication of all affected structural steel, the Contractor shall coordinate all sizes and locations of opening requirements with approved equipment shop drawings and the trade involved.
- D. Prior to fabrication of all affected structural steel, the Contractor shall coordinate all support framing dimensional requirements associated with support of all mechanical equipment with approved equipment shop drawings and the trade involved.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. The Contractor is responsible for all means and methods associated with all removals and new construction, including the design of such, to keep the structure and all of the building features (including, but not limited to, the structural framing systems and walls) to remain secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads, including, but not limited to, providing temporary shores, guys, braces, and other supports during erection. Unless otherwise indicated, the Contractor is responsible for determining when it is appropriate to remove any temporary supports. However, as a minimum, these temporary supports shall not be removed prior to permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- B. Leveling, Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting leveling, base and bearing plates. Clean bottom surface of leveling, base and bearing plates.
 - 1. Set leveling, base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
 - 3. Promptly pack grout solidly between bearing surfaces and leveling, base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
- D. Splice members only where indicated.
- E. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, unless otherwise noted on the drawings.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.05 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Refer to Section 01 45 33 "Code-Required Special Inspections and Procedures" for additional information.
- B. Bolted Connections: Field-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Field Welded Connections: As a minimum, all field welds will be visually inspected according to AWS D1.1.
 1. If the results of the visual inspections indicate that the quality of the welds do not meet the minimum AWS standards and requirements, or show signs of specific concern, the affected field-welded connections will be tested and inspected according to AWS D1.1 in accordance of one or more of the following inspection procedures as applicable. The selected testing method(s) will be at the testing agency's option that best suits the conditions or concern.
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.06 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Roof deck.
 - 2. Composite Floor Deck.
 - 3. Noncomposite form deck.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 45 33 "Code-Required Special Inspections and Procedures" for independent testing agency procedures and administrative requirements.
 - 2. Division 5 Section "Structural Steel Framing" for framing deck openings with steel shapes.
 - 3. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
 - 4. Division 9 painting Sections for repair painting of primed deck.

1.03 SUBMITTALS

- A. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate some portion of the work showing fabrication, layout, setting or erection details.

Refer to Division 1, Section 01 30 00 - "Administrative Requirements" and information within this section for additional submittal requirements.

 - 1. Identify details by reference to sheet and detail numbers shown on shop drawings.
 - 2. Sheet size, multiple of 8 ½ by 11 inches, not to exceed size of contract drawings when unfolded.
 - 3. **Photographic reproductions of contract drawings will NOT be accepted as shop drawings and will be REJECTED without review.**
- B. Portable Document Format (PDF) Files: All submittals required for this section (including, but not limited to, Product Data, Shop Drawings, Product Certificates, Welding Certificates, and Product Test Reports) shall be submitted to the A/E in "PDF" electronic format.
- C. Product Data: For each type of deck, accessory, and product indicated.

- D. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.
- E. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.
- F. Welding Certificates: Copies of certificates for welding procedures and personnel.
- G. Field quality-control test and inspection reports.
- H. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
 - 1. Mechanical fasteners: At the Contractor's option, mechanical fasteners may be used in lieu of welding to fasten deck. If mechanical fasteners are proposed to be used, the Contractor shall submit for review and approval all necessary supporting calculations, documentation and manufacturer's written instructions verifying that the strength of the proposed mechanical fastening system meets or exceeds that of the welded fastening shown on the contract documents. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- E. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- F. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical roof deck with factory-installed insulation to maintain insulation free of moisture.

1.06 COORDINATION

- A. The General Contractor is responsible for coordinating edge of deck (E.O.D.) and edge of opening dimensions and locations with the requirements of all Trades, information contained within the Contract Documents for all Trades and existing conditions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Steel Deck:
 - a. ASC Profiles, Inc.
 - b. Canam Steel Corp.;The Canam Manac Group.
 - c. Consolidated Systems, Inc.
 - d. DACS, Inc.
 - e. D-Mac Industries Inc.
 - f. Epic Metals Corporation.
 - g. Marlyn Steel Decks, Inc.
 - h. New Millennium Building Systems, LLC.
 - i. Nucor Corp.; Vulcraft Division.
 - j. Roof Deck, Inc.
 - k. United Steel Deck, Inc.
 - l. Valley Joist; Division of EBSCO Industries, Inc.
 - m. Verco Manufacturing Co.
 - n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.02 ROOF DECK

- A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and the following:
 - 1. Steel Sheet Grades and Finishes: Roof deck to be Galvanized Steel sheet unless specifically noted to be Galvanized and Shop-Primed Painted on the drawings.

- a. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, **G90 zinc coating**.
2. If metal deck is to be painted, the metal deck shall be Galvanized and Shop-Primed and the shop primer shall be compatible with the finish paint system. The Contractor shall coordinate all areas to receive paint with the architectural requirements and the architectural room finish schedule.
 - a. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, **G90 zinc coating**; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer or as noted. Color to be compatible with and coordinated with finished paint system.
3. Deck Profile and Depth: See Drawings for specific locations of each deck depth and profile type. NOTE: NOT INVERTED DECK.
 - a. 1-1/2 inches, Type WR, Wide Rib (or as approved equal), typical unless otherwise noted.
 - b. 3-inches, Type 3DR, Deep Rib (or as approved equal).
4. Design Uncoated-Steel Thickness: See Drawings (0.0358 inch, 20 ga. minimum unless noted otherwise).
5. Span Condition: See Drawings (Triple span or more where possible).
6. Side Laps: See Drawings (Nested side laps unless noted otherwise).

2.03 COMPOSITE FLOOR DECK

- A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following properties, deck profile, Design Uncoated-Steel Thickness and Span Condition. See the Drawings for type of floor deck to be used in each area :
 1. 1 1/2 -inch Composite Steel Floor Deck: See Drawings for locations to be used.
 - a. Steel Sheet Grades and Finishes: Metal deck to be Galvanized Steel sheet unless required to be Galvanized and Shop-Primed Painted.

Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, **G90 zinc coating**.
 - b. If metal deck is to be painted, the metal deck shall be Galvanized and Shop-Primed and the shop primer shall be compatible with the finish paint system. The Contractor shall coordinate all areas to receive paint with the architectural requirements and the architectural room finish schedule.

Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, **G90 zinc coating**; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer or as noted. Color to be compatible with and coordinated with finished paint system.
 - c. Deck Profile & Depth: 1 1/2-inch "B" Lock or as approved equal unless noted otherwise). NOTE: NOT INVERTED DECK.
 - d. Design Uncoated-Steel Thickness: See Drawings (0.0358 inch, 20 ga. Minimum unless noted otherwise).

- e. Span Condition: See Drawings (Triple span or more where possible unless noted otherwise).

2.04 NONCOMPOSITE FORM DECK

- A. Noncomposite Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
 - 1. If metal deck is to be painted, the metal deck shall be Galvanized and Shop-Primed and the shop primer shall be compatible with the finish paint system. The Contractor shall coordinate all areas to receive paint with the architectural requirements and the architectural room finish schedule.
 - a. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, **G90 zinc coating**; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer or as noted. Color to be compatible with and coordinated with finished paint system.
 - 2. Profile Depth: See Drawings (9/16 inches unless noted otherwise).
 - 3. Design Uncoated-Steel Thickness: See Drawings (0.02958 inch, 22 ga. Minimum unless noted otherwise).
 - 4. Span Condition: See Drawings (Triple span or more where possible).
 - 5. Side Laps: See Drawings (Interlocking seam unless noted otherwise unless noted otherwise)

2.05 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- G. Pours Stops: If not shown as structural steel, provide steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck; of thickness and profile indicated, as recommended by SDI Publication No. 30 for overhang and slab depth or as required for application.
- H. **Girder Fillers: PLEASE NOTE that Use of Girder Fillers is NOT allowed. The deck layout and the need to cut the deck to avoid the use of Girder Fillers shall be taken into consideration when bidding and preparing shop drawings. Shop drawings**

submitted using girder fillers will be returned NOT reviewed and will be required to be Revised and Resubmitted. Absolutely No Exceptions.

- I. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- J. Rolled-in (Integral) Hanger Tabs: UL Approved rolled-in (integral) hanger tabs for use with floor deck. Refer to Article 3.04.G.
- K. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and sloped recessed pans of 1-1/2- inch minimum depth. For drains, cut holes in the field.
- L. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- M. Galvanizing Repair Paint: ASTM A 780.
- N. Repair Paint: Lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664 of the same color as the primer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. At the Contractor's option, mechanical fasteners may be used in lieu of welding to fasten deck. If mechanical fasteners are proposed to be used, the Contractor shall submit for review and approval all necessary supporting calculations, documentation and manufacturer's written instructions verifying that the strength of the proposed mechanical fastening system meets or exceeds that of the welded fastening shown on the contract documents. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.03 ROOF DECK INSTALLATION

- A. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter, but not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 6 inches apart in the field of the roof and 6 inches apart in roof corners and perimeter, based on roof-area definitions of FMG Loss Prevention Data Sheet 1-28, unless otherwise indicated on drawings.
- B. Perimeter Edge Fastening: Fasten perimeter edges of panels between supports at intervals not exceeding 6 inches, and as follows:
 - 1. Welded with 5/8 inch diameter spot (puddle) welds.
 - 2. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
- C. Side-Lap Fastening: Fasten side laps panels between supports, at intervals not exceeding 6 inches, or as indicated on the Drawings, and as follows:
 - 1. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
- D. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum.
- E. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 6 inches apart with at least 1 weld at each corner.
 - 1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.
- F. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
- G. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- H. Sound-Absorbing Insulation: If required, installation into topside ribs of deck as specified in Division 07 Section.

3.04 FLOOR DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 1. Weld Diameter: 5/8 inch, nominal.
 2. Weld Spacing: Weld edge ribs of panels at each support not more than 12-inches apart and as shown on the drawings.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches, and as follows:
 1. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
 2. Mechanically clinch or button punch.
 3. Fasten with a minimum of 1 1/2-inch long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 1. End Joints: Butted.
- D. Pour Stops: Weld steel sheet pour stops to supporting structure according to SDI recommendations, unless otherwise indicated.
- E. **Girder Fillers: PLEASE NOTE that Use of Girder Fillers is NOT allowed. The deck layout and the need to cut the deck to avoid the use of Girder Fillers shall be taken into consideration when bidding and preparing shop drawings. Shop drawings submitted using girder fillers will be returned NOT reviewed and will be required to be Revised and Resubmitted. Absolutely No Exceptions.**
- F. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- G. Hanger Tabs, Slots, or Clips
 1. Provide UL approved rolled-in (integral) hanger tabs or punched hanger slots between cells or flutes of lower element where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures, only where deck manufacturer allows such loads and provide hanging attachment devices.
 2. Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger tabs or slots.

3. Locate tabs, slots, or clips at not more than 14 inches o.c. in both directions, not over 9 inches from walls at ends, and not more than 12 inches from walls at sides, unless otherwise shown.

3.05 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Refer to Section 014533 "Code-Required Special Inspections and Procedures" for additional information.
- B. If required, field welds will be subject to inspection.
- C. If required, testing agency will report test results promptly and in writing to Contractor and Architect.
- D. If required, remove and replace work that does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.06 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on primed surfaces of Galvanized and prime-painted deck immediately after installation, and apply repair paint.
 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Division 9 Section.
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel stud exterior wall framing.

1.02 DEFINITIONS

- A. General: See AISI S240 for definitions of terms used in this section.
- B. Connection: A combination of structural elements and joints used to transmit forces between two or more members.
- C. Connector: A device used to transmit forces between cold-formed steel structural members or between a cold-formed steel structural member and another structural element.

1.03 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.
- F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- H. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.04 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.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by affected installers.

1.05 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, base steel thickness, corrosion protection, and dimensions.
- C. Product Data: Provide manufacturer's data on factory-made connectors and mechanical fasteners, showing compliance with requirements.
- D. 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.

- E. Steel Framing Industry Association (SFIA) Certification:
 - 1. Submit documentation that metal studs and connectors used on project meet or exceed requirements of International Building Code.
 - 2. Design Data:
 - a. Shop drawings signed and sealed by a professional structural engineer.
 - 3. Design calculations sufficient to demonstrate compliance with design criteria; signed and sealed by a professional structural engineer.
 - 4. Details and calculations for factory-made connectors, signed and sealed by a professional structural engineer.

1.06 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 in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Structural Framing:
 - 1. ClarkDietrich Building Systems: www.clarkdietrich.com.
 - 2. MarinoWARE: www.marinoware.com.
- B. Connectors:
 - 1. Same manufacturer as metal framing.

2.02 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.
- B. Regulatory Requirements: Comply with applicable building code criteria for loads, including seismic loads.
 - 1. Design Criteria: In accordance with applicable codes.
 - a. Wind Loads: 20 psf positive and 24 psf negative.
 - 2. Live load deflection meeting the following, unless otherwise indicated:
 - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/240 of span.
 - 3. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 4. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - 5. Fabrication:
 - a. Deliver to project site in largest practical sections.

2.03 MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.
 - 1. Structural Grade: As required to meet design criteria.
 - 2. Corrosion Protection Coating Designation: CP 60 in accordance with AISI S240.

2.04 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. Thickness and Depth: Depth as indicated on the drawings; thickness and structural grade as required to meet design criteria.
2. Provide components fabricated from ASTM A1011/A1011M Designation SS (structural steel).

2.05 MISCELLANEOUS CONNECTIONS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot-dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.

2.06 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.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.02 PREPARATION

- A. Structural Wall Foundations: For gaps between wall bottom track and top of foundation 1/4 inch or greater, level substrate with loadbearing shims or grout between track and foundation.

3.03 INSTALLATION - GENERAL

- A. Install structural members and connections in compliance with ASTM C1007.

3.04 INSTALLATION OF STUDS

- A. Install wall studs plumb and level.
- B. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- C. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- D. Install load-bearing studs; brace, and reinforce to develop full strength and achieve design requirements.
- E. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- F. Install intermediate studs above and below openings to align with wall stud spacing.
- G. Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.
- H. Attach cross studs to studs for attachment of fixtures anchored to walls.
- I. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- J. Touch-up field welds and damaged corrosion protected surfaces with primer.

3.05 TOLERANCES

- A. Studs - Vertical Alignment (Plumbness): 1/960 of span or 1/8 inch in 10 ft, in accordance with ASTM C1007.

- B. Studs - Maximum Variation from True Position: 1/8 inch in accordance with ASTM C1007.
- C. Stud Spacing: 1/8 inch from the designated spacing, provided that the cumulative error does not exceed the requirements of the finishing materials in accordance with ASTM C1007.

END OF SECTION

**SECTION 05 51 00
METAL STAIRS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stairs with metal treads.
- B. Structural steel stair framing and supports.
- C. Handrails and guards.
- D. Prefabricated stair treads and nosings.

1.02 REFERENCE STANDARDS

- A. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- G. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates; 2015 (Reapproved 2021).
- H. 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; 2023.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

1.03 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.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

1.04 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
 - 2. A company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
 - 1. Regulatory Requirements: Provide stairs and railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.
 - 2. Handrails: Comply with applicable accessibility requirements of ADA Standards.
 - 3. Structural Design: Provide complete stair and railing assemblies that comply with the applicable local code.
 - 4. Dimensions: As indicated on drawings.
 - 5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 - 6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 - 7. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
 - 1. Service: Exposed joints tight with face surfaces aligned; underside of stair not covered by soffit is not considered exposed to view.
 - a. Welded Joints: Welded on back side wherever possible.
 - b. Welds Exposed to View: Ground smooth; not required to be flush.
 - c. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts or screw threads.
 - d. Metal Surfaces to be Painted: Sanded smooth, suitable for satin or matte finish.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH METAL TREADS

- A. Jointing and Finish Quality Level: Service, as defined above.
- B. Risers: Open.
- C. Treads: Checkered steel plate.
 - 1. Tread Thickness: 1/8 inch, minimum.
 - 2. Nosing: Plate bent to minimum radius with down return of 2 inch minimum.
 - 3. Riser: Plate bent to minimum radius with up return of 2 inch minimum.
 - 4. Anchorage to Stringers: Welded to carrier angles bolted to stringers.
- D. Stringers: Rolled steel channels.
 - 1. Stringer Depth: 10 inches.
- E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.
- F. Railings: Steel pipe railings.
- G. Finish: Shop- or factory-prime painted.

2.03 HANDRAILS AND GUARDS

- A. Wall-Mounted Rails: Round pipe or tube rails unless otherwise indicated.
 - 1. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
- B. Guardrails:
 - 1. Rails: Tube rails as detailed on drawings, unless otherwise indicated.
 - a. Size: 1 1/2 inch by 1 1/2 inch by 3/16 inch thick.

2. Infill at Mesh Railings: Woven wire mesh panels.
 - a. Material and Finish: Same as stair.
 - b. Wire Size: 0.187 inch.
 - c. Wire Spacing: 2 inch.
 - d. Mounting: Mesh welded to steel U-channel frame, frame welded to posts.
3. End and Intermediate Posts: Same material and size as top rails.
 - a. Horizontal Spacing: As indicated on drawings.
 - b. Mounting: Welded to top surface of stringer.

2.04 MATERIALS

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
- C. Pipe: ASTM A53/A53M Grade B Schedule 40, black finish.
- D. Checkered Plate: ASTM A786/A786M, rolled steel floor plate; manufacturer's standard pattern.

2.05 ACCESSORIES

- A. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
- B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C. Shop and Touch-Up Primer: SSPC-Paint 15, and comply with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- E. Obtain approval prior to site cutting or creating adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

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SECTION 05 51 33 METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Prefabricated ladders.

1.02 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- C. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
- D. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- E. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

PART 2 PRODUCTS

2.01 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Bolts, Nuts, and Washers: Stainless steel.
- E. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.02 PREFABRICATED LADDERS

- A. Prefabricated Ladder: Welded metal unit complying with 29 CFR 1910.23 and ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
 - 1. Components: Manufacturer's standard rails, rungs, treads, handrails, returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
 - a. Provide off-floor mounting with brackets as required to support wall mounted ladder.
 - 2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
 - 3. Finish: Mill finish aluminum.
 - 4. Manufacturers:
 - a. O'Keeffe's Inc: Model 503A: www.okeeffes.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 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. Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION

**SECTION 06 10 00
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roofing nailers.
- B. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. AWP A U1 - Use Category System: User Specification for Treated Wood; 2023.
- C. PS 20 - American Softwood Lumber Standard; 2021.
- D. SPIB (GR) - Standard Grading Rules; 2021.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on rough carpentry items.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.04 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWP A U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. 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.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.
 - 9. Joints of rigid wall coverings that occur between studs.

3.03 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at each roof opening except where prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

3.04 CLEANING

- A. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 61 16
SOLID SURFACE FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the following solid surface product types:
 - 1. Toilet Room Vanities.
 - 2. Countertops.
- B. Definition: Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.02 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
 - b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
- C. Product Data: Indicate product description, fabrication information and compliance with specified performance requirements.
- D. Samples:
 - 1. For each type of product indicated.
 - a. Submit minimum 6-inch by 6-inch sample in specified gloss.
 - b. Cut sample and seam together for representation of inconspicuous seam.
 - c. Indicate full range of color and pattern variation.
 - 2. Approved samples will be retained as a standard for work.
- E. Maintenance Data:
 - 1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
 - a. Maintenance kit for finishes shall be submitted.
 - 2. Include in project closeout documents.

1.03 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
- B. Fabricator/installer qualifications:
 - 1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.
- C. Applicable standards:
 - 1. Standards of the following, as referenced herein:
 - a. American National Standards Institute (ANSI)
 - b. American Society for Testing and Materials (ASTM)
 - c. National Electrical Manufacturers Association (NEMA)
 - 2. Fire test response characteristics:
 - a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1) Flame Spread Index: 25 or less.

- 2) Smoke Developed Index: 450 or less.
- D. Drawings shall:
 1. Be produced in 1/2-inch scale for all fabricated items.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver no components to project site until areas are ready for installation.
- B. Store components indoors prior to installation.
- C. Handle materials to prevent damage to finished surfaces.
 1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.05 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty against defects in materials.
 1. Warranty shall provide material and labor to repair or replace defective materials.
 2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
- C. Manufacturer's warranty period:
 1. Ten years from date of substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers:
 1. Subject to compliance with requirements, provide products by one of the following:
 - a. Avonite Surfaces: www.avonitesurfaces.com.
 - b. Corian Solid Surfaces: www2.dupont.com.
 - c. LG Hi-Macs: www.lghausys.com.
 - d. Wilsonart Solid Surface: www.wilsonartcontract.com.
 - e. or Approved Equivalent.

2.02 MATERIALS

- A. Solid polymer components
 1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
 2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.
- B. Thickness:
 1. 1/2 inch unless indicated otherwise.
- C. Edge treatment:
 1. Eased Edge.
- D. Performance characteristics:

Property	Typical Result	Test
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5 x 10 ⁶ psi	ASTM D 638
Tensile Elongation	0.4% minimum	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2 x 10 ⁶ psi	ASTM D 790
Hardness	>85 Rockwell "M" Scale 56 Barcol Impressor	ASTM D 785 ASTM D 2583

Thermal Expansion	3.02 x 10 ⁻⁵ in./in./°C (1.80 x 10 ⁻⁵ in./in./°F)	ASTM D 696
Gloss (60° Gardner)	5-75 (matte-highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000 Method 3.3
Wear and Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance: Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus & Bacteria Resistance	Does not support microbial growth	ASTM G21&G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000 Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000 Method 3.6
Izod Impact (Notched Specimen)	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact Resistance: Sheets	No fracture - 1/2 lb. ball: 1/4" slab - 36" drop 1/2" slab - 144" drop	NEMA LD 3-2000 Method 3.8
Weatherability	?E*94<5 in 1,000 hrs.	ASTM G 155
Specific Gravity †	1.7	
Water Absorption	Long-term 0.4% (3/4") 0.6% (1/2") 0.8% (1/4")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test ("LC50"Test)
Flammability	All colors (Class I and Class A)	ASTM E 84,NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

† Approximate weight per square foot: 1/4" (6 mm) 2.2 lbs., 1/2" (12.3 mm) 4.4 lbs.

Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.

NEMA results based on the NEMA LD 3-2000

2.03 ACCESSORIES

- A. Joint adhesive:
 - 1. Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.
- B. Sealant:
 - 1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone - any type), UL-listed silicone sealant in colors matching components.

2.04 LAVATORY BOWLS

- A. Size: 16 1/2 inches x 13 inches x 5 3/4 inches deep.
- B. Prep for trim to be provided by Division 22.

- C. Colors: To be selected from manufacturers standard range.

2.05 FACTORY FABRICATION

- A. Shop Assembly
 - 1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
 - 2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
 - a. Reinforce with strip of solid polymer material, 2" wide.
 - 3. Rout and finish component edges with clean, sharp returns.
 - a. Rout cutouts, radii and contours to template.
 - b. Smooth edges.
 - c. Repair or reject defective and inaccurate work.

2.06 FINISHES

- A. Select from the manufacturer's full color chart.
 - 1. To be selected from manufacturer's groups 1 through 5 (based on Corian).
- B. Finish:
 - 1. Provide surfaces with a uniform finish.
 - a. Matte; gloss range of 5-20.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
 - 1. Provide product in the largest pieces available.
 - 2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
 - a. Exposed joints/seams shall not be allowed.
 - 3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
 - 4. Cut and finish component edges with clean, sharp returns.
 - 5. Rout radii and contours to template.
 - 6. Anchor securely to base cabinets or other supports.
 - 7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
 - 8. Carefully dress joints smooth, remove surface scratches and clean entire surface.
 - 9. Install horizontal surfaces with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

3.03 CLEANING AND PROTECTION

- A. Keep components clean during installation.
- B. Remove adhesives, sealants and other stains.
- C. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

END OF SECTION

SECTION 07 05 53
FIRE AND SMOKE ASSEMBLY IDENTIFICATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.02 REFERENCE STANDARDS

- A. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 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.

PART 2 PRODUCTS

2.01 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 or paper sign with factory applied adhesive backing.
- C. Languages: Provide sign markings in English.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. Locate markings as required by ICC (IBC).
- B. Install adhered markings in accordance with manufacturer's instructions.
- C. Install neatly, with horizontal edges level.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.
- E. Install labeling as follows:
 - 1. At each new penetration through a new or existing fire-rated partition, place a marking label on the wall within 3 feet of the penetration on the corridor side, located above the ceiling.
 - 2. Label shall include lettering not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke in a contrasting color.
 - 3. Label shall read: "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS" or similar language to be approved by the Architect.

END OF SECTION

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**SECTION 07 13 00
SHEET WATERPROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Self-adhered modified bituminous sheet membrane.
- B. Blindside sheet membrane.

1.02 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
- C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2018.
- D. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- E. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 2020.
- F. ASTM D6506/D6506M - Standard Specification for Asphalt Based Protection Board for Below-Grade Waterproofing; 2001, with Editorial Revision (2018).
- G. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for membrane, flexible flashings, and joint and crack sealants.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 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 and approved by manufacturer.

1.05 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.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water.

PART 2 PRODUCTS

2.01 SHEET WATERPROOFING MATERIALS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
 - 1. Application: Outside face of new basement foundation walls.
 - 2. Thickness: 60 mil, 0.060 inch, minimum.
 - 3. Sheet Width: 36 inches, minimum.

4. 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.
5. Elongation at Break: 300 percent, minimum, measured in accordance with ASTM D412.
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. 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.
8. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
9. Basis of Design:
 - a. Soprema Inc.; Colphene 3000: www.soprema.us.
- B. Blindside Waterproofing, Modified Bituminous Sheet Membrane: Asphalt and polymer modifiers of SBS type, reinforced with nonwoven glass fibers; smooth surfaced.
 1. Application: Top of footer, below slab on grade at the basement, and on the back side of the foundation wall at the basement, between the footer and slab, as shown on the drawings.
 2. Formulated for seaming by lap adhesion.
 3. Thickness: 120 mil, 0.120 inch, minimum.
 4. Sheet Width: 39-3/8 inches, minimum.
 5. Tensile Strength: 3,000 psi, measured in accordance with ASTM D412.
 6. Ultimate Elongation: 65 percent, measured in accordance with ASTM D412.
 7. Water Absorption: 0.5 percent increase in weight, maximum, measured in accordance with ASTM D570, water immersion.
 8. Basis of Design:
 - a. Soprema, Inc; COLPHENE BSW H (horizontal application) and COLPHENE BSW V (vertical application): www.soprema.us.

2.02 ACCESSORIES

- A. Seaming Materials: As recommended by membrane manufacturer.
- B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- C. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.
 1. Multilayer internally-reinforced asphaltic panels, 1/8 inch thick, nominal, complying with ASTM D6506/D6506M.
 2. Compressive Strength: 1610 psi.
 3. Products:
 - a. Soprema, Inc.; SOPRABOARD: www.soprema.us.
- D. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.
 1. Application: Outside face of all new basement foundation walls.
 2. Composition: Dimpled polystyrene, polyethylene, or polypropylene core; polypropylene filter fabric.
 3. Thickness: 3/8 inch.
 4. Basis of Design:
 - a. Soprema Inc.; SOPRADRAIN 102: www.soprema.us.
- E. Flexible Flashings: Type recommended by membrane manufacturer.
- F. Adhesives: As recommended by membrane manufacturer.

- G. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify that items penetrating surfaces to receive waterproofing are securely installed.
- D. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 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.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Fill nonmoving joints and cracks with a filler compatible with waterproofing materials.
- E. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F. Install protection board following membrane manufacturer's instructions.

3.03 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.

3.04 INSTALLATION - DRAINAGE PANEL

- A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward; scribe and cut boards around projections, penetrations, and interruptions.
- B. Adhere drainage panel to substrate with compatible adhesive.

3.05 FIELD QUALITY CONTROL

- A. The contractor shall request the waterproofing system manufacturer's representative visit the job site before, during and after the installation of the waterproofing system. The Architect shall be notified prior to the manufacturer's site visits. The manufacturer shall approve the horizontal waterproofing installation prior to pouring the concrete slab-on-grade.

3.06 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

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**SECTION 07 21 00
THERMAL INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at cavity wall construction, perimeter foundation wall, and exterior wall behind metal siding wall finish.

1.02 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- G. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

1.03 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.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation at and within Perimeter of Foundation: Extruded polystyrene (XPS) board.
- B. Insulation Inside Masonry Cavity Walls: Mineral fiber board.
- C. Insulation Over Metal Stud Framed Walls, Continuous: Mineral fiber board.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type: ASTM C578, Type IV.
 - 2. Flame Spread Index: 25 or less, 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. Complies with fire resistance requirements specified as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 - 6. Board Edges: Square.
 - 7. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
 - 8. Products:

2.03 MINERAL FIBER BOARD INSULATION MATERIALS

- A. Mineral Wool Block, Board, or Blanket Thermal Insulation: Complying with ASTM C612 or ASTM C553.
 - 1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 2. Board Size: 16 by 48 inches.
 - 3. Board Thickness: 1 inch.
 - 4. Thermal Resistance: R-value of 4.2 per inch at 75 degrees F, minimum, when tested in accordance with ASTM C518.
 - 5. Products:
 - a. Johns Manville; CladStone Water & Fire Block Insulation: www.jm.com.
 - b. ROCKWOOL (ROXUL, Inc); CAVITYROCK: www.rockwool.com.

PART 3 EXECUTION

3.01 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.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Install boards horizontally on foundation perimeter.
 - 1. Butt edges and ends tightly to adjacent boards and to protrusions.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT CAVITY WALLS

- A. Install boards to fit snugly between wall ties.
- B. Install boards horizontally on walls.
 - 1. Butt edges and ends tightly to adjacent boards and protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.04 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 21 19
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Foamed-in-place insulation.
 - 1. In exterior framed walls.

1.02 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, insulation properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.04 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. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

1.05 FIELD CONDITIONS

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- B. Do not apply foam when temperature is within 5 degrees F of dew point.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
 - 1. Aged Thermal Resistance: R-value of 7 (deg F hr sq ft)/Btu, minimum, when tested at 1 inch thickness in accordance with ASTM C518 after aging for 180 days at 41 degrees F.
 - 2. Water Vapor Permeance: Class II vapor retarder; 1 perm, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
 - 3. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
 - 4. Air Permeance: 0.004 cfm/sq ft, maximum, when tested at intended thickness in accordance with ASTM E2178 or ASTM E283 at 1.5 psf.
 - 5. Closed Cell Content: At least 90 percent.

6. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
7. Manufacturers:
 - a. BASF Corporation; SPRAYTITE 178: www.spf.basf.com.
 - b. Carlisle Spray Foam Insulation; SealTite Pro One Zero: www.carlislesfi.com.
 - c. Henry Company; PERMAX 2.0: www.henry.com.
 - d. Icynene Inc; Icynene ProSeal (MD-C-200 v3): www.icynene.com.
 - e. Johns Manville; JM Corbond III Closed Cell Spray Polyurethane Foam: www.jm.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify work within construction spaces or crevices is complete before insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.02 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Apply to achieve a thermal resistance R-value of 28.
- D. Patch damaged areas.
- E. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- F. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 27 00 AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air barriers.

1.02 DEFINITIONS

- A. Air Barrier: Airtight barrier made of material that is virtually air impermeable but water vapor permeable, both to amount as specified, with sealed seams and sealed joints to adjacent surfaces.

1.03 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. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience, and approved by manufacturer.
- B. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

1.05 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)

- A. Air Barrier Sheet, Self-Adhered:
 - 1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - 2. Water Vapor Permeance: 10 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 90 days 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. Comply with NFPA 285 requirements for wall assembly.
 - 6. Seam and Perimeter Tape: As recommended by sheet manufacturer.
 - 7. Basis of Design:
 - a. Soprema, Inc; SOPRASEAL Stick VP: www.soprema.us.

2.02 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions.
- B. Foil-Faced Self-Adhering Flashing: Membrane consisting of cross-laminated high-density polyethylene facer laminated to ultraviolet (UV) and weather-resistant exterior aluminum foil facer, using nonasphaltic, butyl-based adhesive to self-adhere to substrate.
 - 1. Thickness: 45 mil, 0.045 inch, minimum.
 - 2. Roll Size: 50 feet long by 4 inches wide.
 - 3. Tensile Strength: 400 psi, minimum, complying with ASTM D412.
 - 4. Basis of Design:

- a. Soprema Inc., Sopraseal Stick 1100 T .
- C. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready for work of this section.
- B. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
- C. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.02 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.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with 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 to adjacent substrates, and as flashing.
 - 5. At wide joints, provide extra flexible membrane allowing joint movement.
- E. Openings and Penetrations in Exterior Air Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto air barrier 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 air 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 air barrier extending at least 2 inches beyond face of jambs; seal air barrier to flashing.
 - 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 6. Service and Other Penetrations: Form flashing around penetrating item and seal to air barrier surface.

3.04 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

**SECTION 07 42 13
METAL WALL PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured metal panels for exterior wall panels, with related flashings and accessory components.

1.02 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components shown on shop drawings.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions and recommendations.
- C. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.
- D. Samples: Submit two samples of wall panel, 12 inches by 12 inches in size illustrating finish color, sheen, and texture.
- E. Test Reports: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.04 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 installing products specified in this section with minimum three years of documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.06 FIELD CONDITIONS

- A. Do not install wall panels when air temperature or relative humidity are outside manufacturer's limits.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 20-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.
- C. Special Warranty: Provide 2-year warranty covering water tightness and integrity of seals of metal wall panels. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 METAL WALL PANEL SYSTEM

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
 - 1. Provide exterior wall panels.
 - 2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
 - 3. Design Pressure:
 - a. Positive Design Pressure: + 20 psf.
 - b. Negative Design Pressure: - 24 psf.
 - 4. Fire Performance: Tested in accordance with, and complying with acceptance criteria of NFPA 285.
 - 5. Maximum Allowable Deflection of Panel: L/180 for length(L) of span.
 - 6. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
 - 7. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 - 8. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 - 9. Corners: Factory-fabricated in one continuous piece with minimum 2-inch returns.
- B. Exterior Wall Panels:
 - 1. Basis of Design: Centria, Concept Series,
 - a. Panel Type-1: Model CS-660.
 - b. Panel Type-2: Model CS-200.
 - 2. Profile: Horizontal.
 - 3. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.
 - 4. Material: Precoated steel sheet, 20 gauge, 0.0359 inch minimum thickness.
 - 5. Panel Width: Type-1: 16 inches, Type-2: 12 inches.
 - 6. Panel Thickness: 7/8 inches.
 - 7. Color: As selected by Architect from manufacturer's standard line. Two colors to be selected.
- C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
- D. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- E. Clip: Manufacturer's standard, 0 inch offset.
- F. Anchors: Galvanized steel.

2.02 MATERIALS

- A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Structural Steel (SS) or Forming Steel (FS), with G90/Z275 coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.03 FINISHES

- A. Exposed Surface Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating, top coat over epoxy primer.
 - 1. Basis of Design Finish: Metl-Span FI.
- B. Panel Backside Finish: Panel manufacturer's standard siliconized polyester wash coat.
- C. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat metal coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected from manufacturer's standards and premium (non-metallic) options.

2.04 ACCESSORIES

- A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
- B. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.
 - 1. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws.
- C. Field Touch-up Paint: As recommended by panel manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building framing members are ready to receive panels.

3.02 INSTALLATION

- A. Install panels on walls in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint; allow to dry prior to wall panel installation.
- C. Fasten panels to structural supports; aligned, level, and plumb.
- D. Locate joints over supports.
- E. Cut first (bottom) course of Panel Type-1 as required to locate Panel Type-2 at elevation shown on drawings.

3.03 TOLERANCES

- A. Offset From True Alignment Between Adjacent Members Abutting or In Line: 1/16 inch, maximum.
- B. Variation from Plane or Location As Indicated on Drawings: 1/4 inch, maximum.

3.04 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.
- C. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610.

3.05 PROTECTION

- A. Protect metal wall panels until completion of project.

- B. Touch-up, repair, or replace damaged wall panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 DESCRIPTION

- A. (Alternate) Existing Metal Deck, Partial Tear Off:
 - 1. Remove existing membrane and repair damaged and or saturated insulation as indicated on the drawings. Mechanically fasten new insulation, through existing insulation to remain, to the metal deck. Fully adhere EPDM membrane in accordance with current specifications and details.
- B. New Metal Deck (building addition):
 - 1. Mechanically fasten the insulation to the metal deck. Fully adhere EPDM membrane in accordance with current specifications and details.

1.02 SECTION INCLUDES

- A. Elastomeric roofing membrane application.
- B. Insulation, flat and tapered.
- C. Roofing stack boots, roofing expansion joints, and walkway pads.

1.03 RELATED REQUIREMENTS

- A. Section 01 23 00 - Alternates.

1.04 REFERENCE STANDARDS

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-- Tension; 2016 (Reapproved 2021).
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
- D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2020).
- E. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015, with Editorial Revision (2022).
- F. FM (AG) - FM Approval Guide; Current Edition.
- G. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2022).
- H. NRCA (WM) - The NRCA Waterproofing Manual; 2021.
- I. Building Code of New York State: Chapter 15, Roof Assemblies and Rooftop Structures.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and setting plan for tapered insulation.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
 - 1. Certification of manufacturers warranty reserve.
 - 2. Certification indicating the manufacturer has reviewed and agreed to the wind coverage requirements noted in the warranty paragraph.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- C. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the building owner seventy-two (72) hours prior to the manufacturer's final inspection.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

1.09 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 100 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Contractors Warranty: Furnish Contractor's two year guarantee for all materials and workmanship starting from date of Substantial Completion.
- C. Provide manufacturer's 20 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 90 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage. All products including substrate boards, insulation, fasteners, fastening plates and edgings must be manufactured and/or supplied by the roofing system manufacturer and covered by the warranty.
- D. (Alternate) Provide manufacturer's 30 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 90 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage. All products including substrate boards, insulation, fasteners, fastening plates and edgings must be manufactured and/or supplied by the roofing system manufacturer and covered by the warranty.

- E. Pro-rated System Warranties shall not be accepted.
- F. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle SynTec Systems: www.carlisle-syntec.com.
 - 2. Elevate: www.holcimelevate.com.
 - 3. Johns Manville: www.jm.com.

2.02 ROOFING

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Roofing Assembly Requirements:
 - 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class C.
 - 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
 - 3. Insulation Thermal Resistance (R-Value): +/- 6 per inch, minimum; provide insulation of thickness required for an overall minimum roof R-value of 30.
 - 4. Wind Resistance: Roof coverings shall be designed to resist a basic wind speed (3-second gust) of 120 MPH at 10 meters above the ground, in accordance with the requirements of the Building Code of New York State, Chapter 15, Roof Assemblies and Rooftop Structures.
- C. Acceptable Insulation Types - Constant Thickness Application: Any of types specified.
 - 1. Minimum 2 layers of polyisocyanurate board.
- D. Acceptable Insulation Types - Tapered Application: Any of types specified.
 - 1. Tapered polyisocyanurate board.
 - 2. Uniform thickness composite or polyisocyanurate board covered with tapered polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-monomer (EPDM); externally reinforced with fabric; complying with minimum properties of ASTM D4637/D4637M.
 - 1. Thickness: 60 mil, 0.060 inch, minimum.
 - 2. Thickness (Alternate): 90 mil, 0.090 inch minimum.
 - 3. Sheet Width: 76 inches, maximum.
 - a. Adhered Application: Limit width to 120 inches, maximum, when ambient temperatures are less than 40 degrees F for extended period of time during installation.
 - 4. Color: Black.
 - 5. Tensile Strength: 1305 psi, minimum, measured in accordance with ASTM D412.
 - 6. Ultimate Elongation: 300 percent, minimum, measured in accordance with ASTM D412.
 - 7. Tear Strength: 150 lbf per inch, measured in accordance with ASTM D624.
 - 8. Water Absorption: +8, -2 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
 - 9. Water Vapor Permeability: 2 perm inch, measured in accordance with ASTM E96/E96M.
 - 10. Brittleness Temperature: -49 degrees F, measured in accordance with ASTM D746.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Flexible Flashing Material: Same material as membrane.
 - 1. Thickness: 60 mil.
 - 2. Elasticity: 50 percent with full recovery without set.

3. Color: Black.

2.04 INSULATION

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
 1. Classifications:
 - a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inches thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
 2. Board Size: 48 by 48 inches.
 3. Board Thickness: 2.0 inch.
 4. Tapered Board: Slope as indicated; minimum thickness 1/4 inch; fabricate of fewest layers possible.
 5. Board Edges: Square.

2.05 ACCESSORIES

- A. Roofing Expansion Joint Flashing: Sheet butyl.
- B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- C. Insulation Fasteners: Appropriate for purpose intended.
 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- D. Membrane Adhesive: As recommended by membrane manufacturer.
- E. Insulation Adhesive: As recommended by insulation manufacturer.
- F. Roofing Nails: Galvanized, hot-dipped type, size and configuration as required to suit application.
- G. Sealants: As recommended by membrane manufacturer.
- H. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 1. Quantity: 30; to be located as directed by Owner.
 2. Composition: Asphaltic with mineral granule surface.
 3. Size: 30 by 30 inches.
 4. Surface Color: Black.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 INSTALLATION - INSULATION, UNDER MEMBRANE

- A. Attachment of Insulation:
 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
- B. Lay subsequent layers of insulation with joints staggered minimum 6 inches from joints of preceding layer.
- C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- D. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- F. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
- G. Do not apply more insulation than can be covered with membrane in same day.

3.03 INSTALLATION - MEMBRANE

- A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Fully Adhered Application: Apply adhesive to substrate at rate recommended by manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- E. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- F. At intersections with vertical surfaces:
 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- G. At gravel stops, extend membrane under gravel stop and to the outside face of the wall.
- H. Around roof penetrations, seal flanges and flashings with flexible flashing.
- I. Install roofing expansion joints where indicated. Make joints watertight.
 1. Install prefabricated joint components in accordance with manufacturer's instructions.
- J. Coordinate installation of roof drains and sumps and related flashings.
- K. Install walkway pads. Space pads to permit drainage. Locate as directed by Owner.

3.04 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Remove bituminous markings from finished surfaces.
- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

3.05 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

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**SECTION 07 71 00
ROOF SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured roof specialties, including copings, fascias, and gravel stops.

1.02 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2022.
- C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- D. NRCA (RM) - The NRCA Roofing Manual; 2023.
- E. ANSI/SPRI ES-1 - American National Standard Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.03 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. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fascias:
 - 1. Shall be manufactured by or approved by roofing system manufacturer and covered under total system warranty.

2.02 COMPONENTS

- A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
 - 1. Configuration: Fascia, and edge securement for roof membrane.
 - 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. Exposed Face Height: As indicated on drawings.
 - 4. Material: Formed steel sheet, galvanized, 24 gauge, 0.024 inch thick, minimum.
 - 5. Finish: 70 percent polyvinylidene fluoride.
 - 6. Color: As selected by Architect from manufacturer's standard range.
 - 7. Products:
 - a. Hickman Edge Systems; TerminEdge EX Fascia: www.hickmanedgesystems.com.
 - b. Approved equivalent.

2.03 FINISHES

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

2.04 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.
- C. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 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. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

END OF SECTION

SECTION 07 84 00 FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- C. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems; 2020a.
- D. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2020a.
- E. 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; 2023.
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- G. ITS (DIR) - Directory of Listed Products; Current Edition.
- H. FM (AG) - FM Approval Guide; Current Edition.
- I. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- J. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- K. UL (DIR) - Online Certifications Directory; Current Edition.
- L. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 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. Sustainable Design Submittal: Submit VOC content documentation for nonpreformed materials.
- E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.04 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.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Verification of minimum three years documented experience installing work of this type.

1.05 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- C. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.02 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. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.03 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by Owner's Independent Testing Agency.

3.04 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

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SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.02 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- B. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- C. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.03 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.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.04 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.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints:
 - a. Seal the following joints:
 - 1) Wall expansion and control joints.
 - 2) Joints between doors, windows, and other frames or adjacent construction.
 - 3) Joints between different exposed materials.
 - 2. Interior Joints:
 - a. Seal the following joints:
 - 1) Joints between door frames, window frames, and other frames and adjacent construction.
 - 2) Other joints and locations noted on the drawings.
 - 3. Do Not Seal:

- a. Intentional weep holes in masonry.
 - b. Joints indicated to be covered with expansion joint cover assemblies.
 - c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
 - d. Joints where sealant installation is specified in other sections.
 - e. Joints between suspended ceilings and walls.
- B. Exterior Joints: Use nonsag silicone sealant, unless otherwise indicated.
- 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
 - 2. Joints between aluminum windows frames and adjacent materials: Silyl-Terminated Polyurethane (STPU) Sealant.
- C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
- 1. Wall and Ceiling Joints in Wet Areas: Nonsag silicone, mildew resistant sealant for continuous liquid immersion.
 - 2. Floor Joints in Wet Areas: Nonsag polyurethane "nontraffic-grade" sealant suitable for continuous liquid immersion.
 - 3. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
- D. Interior Wet Areas: Bathrooms, restrooms, kitchens, and food service areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, and other similar items.

2.02 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.03 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Color: Match adjacent finished surfaces.
- 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.
- C. 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. Color: Match adjacent finished surfaces.
- D. Polyurethane 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 35 percent, minimum.
 - 2. Color: Match adjacent finished surfaces.
- E. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single component; 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. Color: Match adjacent finished surfaces.
- F. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
 - 1. Color: Standard colors matching finished surfaces, Type OP (opaque).
- G. Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

2.04 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. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

- A. 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. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
 - 1. Width/depth ratio of 2:1.
 - 2. Neck dimension no greater than 1/3 of the joint width.
 - 3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. 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.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

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SECTION 08 06 71
DOOR HARDWARE SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Schedule of door hardware sets for swinging as indicated on drawings.

1.02 REFERENCE STANDARDS

- A. BHMA (CPD) - Certified Products Directory; Current Edition.
- B. BHMA A156.3 - Exit Devices; 2020.
- C. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.
- D. BHMA A156.18 - Materials and Finishes; 2020.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Comply with submittal requirements as indicated in Section 08 71 00.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers listed in Door Hardware Schedule or Section 08 71 00 are considered acceptable. Products of other manufacturers are subject to Architects approval.
- B. Obtain each type of door hardware as indicated from a single manufacturer and single supplier.
- C. Products are listed and certified compliant with specified standards by BHMA (CPD).
- D. Manufacturer's Abbreviations: Coordinate with manufacturers listed in Section 08 71 00.
 - 1. BAS - Best Access Systems.
 - 2. CR - Corbin Russwin.
 - 3. HES - HES.
 - 4. McK - McKinney.
 - 5. PEM - Pemko.
 - 6. PH - Precision Hardware.
 - 7. ROC - Rockwood.

2.02 DESCRIPTION

- A. Door hardware sets provided represent the design intent, they are only a guideline and should not be considered a detailed or complete hardware schedule.
 - 1. Necessary items that are not included in a Hardware Set should be added and have the appropriate additional hardware as required for proper application and functionality.
 - 2. Door hardware supplier is responsible for providing proper size and hand of door for products required in accordance with Door Hardware Schedule and as indicated on drawings.
 - 3. Quantities listed are for each Pair (PR) of doors, or for each Single (SGL) door, as indicated in hardware sets.

2.03 LOCK FUNCTION CODES

- A. Function Codes for Cylindrical Locks: Complying with BHMA A156.5.
- B. Function Codes for Exit Devices: Complying with BHMA A156.3.

2.04 FINISHES

- A. Finishes: Complying with BHMA A156.18.

PART 3 EXECUTION

3.01 PROVIDE THE FOLLOWING HARDWARE SETS AT INTERIOR DOORS:

A. Hardware Set No. 1. Provide each opening with the following:

3	Hinges	T4A3786, 4 1/2 x 4 1/2	US26D	McK
1	Lockset - Entrance	9K37AB15DS3	626	BAS
1	Core	7-Pin, SFIC	626	BAS
1	Wall Stop	409, Concave	US26D	ROC

B. Hardware Set No. 2. Provide each opening with the following:

3	Hinges	T4A3786, 4 1/2 x 4 1/2	US26D	McK
1	Lockset - Classroom	9K37R15DS3	626	BAS
1	Core	7-Pin, SFIC	626	BAS
1	Closer	DC8210, Parallel Arm	689	CR
1	Wall Stop	409, Concave	US26D	ROC
1	Smoke Seals	S88	Gray	PEM

C. Hardware Set No. 3. Provide each opening with the following:

3	Hinges	T4A3786, 4 1/2 x 4 1/2	US26D	McK
1	Lockset - Privacy	9K30L15DS3	626	BAS
1	Wall Stop	409, Concave	US26D	ROC

D. Hardware Set No. 4. Provide each opening with the following:

3	Hinges	T4A3786, 4 1/2 x 4 1/2	US26D	McK
1	Lockset - Storeroom	9K37D15DS3	626	BAS
1	Core	7-Pin, SFIC	626	BAS

E. Hardware Set No. 5. Provide each opening with the following:

6	Hinges	T4A3786, 4 1/2 x 4 1/2	US26D	McK
1	Lockset - Storeroom	9K37D15DS3 (active leaf)	626	BAS
1	Core	7-Pin, SFIC	626	BAS
1	Manual Flush Bolts	2905 (inactive leaf, top bolt only)	US32D	ROC

F. Hardware Set No. 6. Provide each opening with the following:

1	Continuous Hinge	FM_HD1	CL	PEM
1	Closer	DC8210, Parallel Arm	689	CR
1	Exit Device - Rim	Apex 2108CD x 4908A	630	PH
2	Cylinders w/ Core	7-Pin, SFIC	630	PH
1	Electric Strike	9600 Series 12/24 VDC	630	HES
1	Wall Stop	409, Concave	US26D	ROC

- G. Hardware Set No. 7. Provide each opening with the following:

3	Hinges	T4A3786, 4 1/2 x 4 1/2	US26D	McK
1	Lockset - Classroom	9K37R15DS3	626	BAS
1	Core	7-Pin, SFIC	626	BAS
1	Wall Stop	409, Concave	US26D	ROC

3.02 PROVIDE THE FOLLOWING HARDWARE SETS AT EXTERIOR DOORS:

- A. Hardware Set No. A. Provide each opening with the following:

1	Continuous Hinge	By Door Manufacturer	DB	--
1	Closer	DC8210, Parallel Arm w/ Hold	690	CR
1	Exit Device - Rim	Apex 2103CD x 4903A	613	PH
2	Cylinders w/ Cores	7-Pin, SFIC	613	PH
1	Electric Strike	9600 Series 12/24 VDC	613	HES
1	Threshold	253x3DFG	D	PEM
1	Sill Sweep	3452DNB	D	PEM

- B. Hardware Set No. B. Provide each opening with the following:

1	Continuous Hinge	By Door Manufacturer	DB	--
1	Closer	DC8210, Parallel Arm w/ Hold Open	690	CR
1	Push Plate	70C	US10B	ROC
1	Pull Plate	110 x 70C	US10B	ROC
1	Wall Stop	409, Concave	US10B	ROC

- C. Hardware Set No. C. Provide each opening with the following:

1	Continuous Hinge	By Door Manufacturer	DB	--
1	Closer	DC8210, Parallel Arm w/ Hold Open	690	CR
1	Exit Device - Rim	Apex 2103 x 4903A	613	PH
1	Cylinder w/ Core	7-Pin, SFIC	613	PH
1	Threshold	253x3DFG	D	PEM

- D. Hardware Set No. D. Provide each opening with the following:

2	Continuous Hinges	By Door Manufacturer	DB	--
2	Closers	DC8210, Parallel Arm w/ Hold Open	690	CR
1	Lockset - Classroom	9K37D15DS3 (active leaf)	613	BAS
1	Cylinder w/ Core	7-Pin, SFIC	613	BAS
2	Manual Flush Bolts	585-12 (top & bottom of inactive leaf)	314E	ROC
1	Threshold	253x3DFG	D	PEM

E. Hardware Set No. E. Provide each opening with the following:

1	Continuous Hinge	By Door Manufacturer	DB	- -
1	Closers	DC8210, Parallel Arm	690	CR
1	Lockset - Classroom	9K37D15DS3	613	BAS
1	Cylinder w/ Core	7-Pin, SFIC	613	BAS
1	Threshold	253x3DFG	D	PEM

END OF SECTION

SECTION 08 12 13 HOLLOW METAL FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal frames for non-hollow metal doors.
- B. Fire-rated hollow metal frames for non-hollow metal doors.

1.02 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2022.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- I. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- M. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.
- N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- O. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- P. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- Q. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.
- R. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- S. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.03 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.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.04 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.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com.
 - 4. Steelcraft, an Allegion brand: www.allegion.com.

2.02 PERFORMANCE REQUIREMENTS

- A. Refer to Door and Frame Schedule on drawings for frame sizes, fire ratings, sound ratings, finishing, door hardware to be installed, and other variations, if any.
- B. Door Frame Type: Provide hollow metal door frames with integral casings.
 - 1. Interior Doors: Use frames with integral casings.
- C. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
- D. Accessibility: Comply with ICC A117.1 and ADA Standards.
- E. 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 frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.
- F. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

2.03 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

- A. Frame Finish: Factory primed and field finished.
- B. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
- C. Fire-Rated Door Frames: Full profile/continuously welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.

2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C or NFPA 252 ("positive pressure fire tests").
3. Smoke and Draft Control Doors all fire-rated doors: Self-closing or automatic closing framed doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
 - a. Maximum Air Leakage: 3.0 cfm/sq ft of framed door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
 - c. Label: Include the "S" label on fire-rating label of door.

2.04 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.05 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

- A. Install frames in accordance with manufacturer's instructions and related requirements of specified 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. Install door hardware as 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.

3.03 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 edges, crossed corner to corner.

3.04 SCHEDULE - SEE DRAWINGS

END OF SECTION

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SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush and flush glazed configuration; fire rated and non-rated.

1.02 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- C. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.03 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. Samples: Submit two samples of door veneer, 3 by 5 inches in size illustrating wood grain, stain color, and sheen.
- E. Specimen warranty.
- F. Warranty, executed in Owner's name.

1.04 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. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.05 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.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.
 - 1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Masonite Architectural: architectural.masonite.com.
 - 2. VT Industries, Inc: www.vtindustries.com.

2.02 DOORS

- A. Doors: See drawings for locations and additional requirements.
 - 1. Quality Level: Custom Grade, Extra Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS).
 - 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 and NFPA 252 ("positive pressure fire tests"); UL or WH (ITS) labeled without any visible seals when door is open (Category A).
 - 3. Smoke and Draft Control Doors (all fire rated doors): In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch w.g. pressure at both ambient and elevated temperatures for "S" label; if necessary, provide additional gasketing or edge sealing.
 - 4. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), 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.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Select white birch, 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.
- B. Facing Adhesive: Type I - waterproof.

2.05 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, top of door for closer, and vertical rod exit devices for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
 - b. Stain: As selected by Architect.

- c. Sheen: Satin.
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 12 13.
- B. Glazing: See Section 08 80 00.
- C. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink styletamper proof screws.
 - 1. Compatible with glazing specified in Section 08 80 00.
- D. Door Hardware: See Section 08 71 00.

PART 3 EXECUTION

3.01 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.

3.02 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.
- 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.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.05 SCHEDULE- SEE DRAWINGS

END OF SECTION

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SECTION 08 16 13
FRP - ALUMINUM FLUSH DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. FRP (Fiberglass Reinforced Polyester) / Aluminum Hybrid doors.
- B. Fire-Rated FRP (Fiberglass Reinforced Polyester) / Fire-Rated Fiberglass Frame.
- C. Aluminum Frames for FRP / Aluminum Hybrid doors.
- D. Accessories, including fasteners and brackets.

1.02 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 1304 - Voluntary Specification for Determining Forced Entry Resistance of Side-Hinged Door Systems.
 - 3. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 - 4. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - 5. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 6. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
- B. ASTM International:
 - 1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 4. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 5. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 - 6. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
 - 7. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
 - 8. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 9. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - 10. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
 - 11. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
 - 12. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 - 13. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
 - 14. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
 - 15. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
 - 16. ASTM D 6670 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
 - 17. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

18. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 19. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 20. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 21. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 22. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 23. ASTM F476- Standard Test Methods for Security of Swinging Door Assemblies.
 24. ASTM F1642 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.
- C. National Fenestration Rating Council:
1. ANSI/NFRC 100 - Procedure for Determining Fenestration Product U-factors.
 2. ANSI/NFRC 400 - Procedure for Determining Fenestration Product Air Leakage.
- D. Local Codes:
1. Building Code of New York State:
 - a. Section 2603.4.1.7 - Doors not required to have a fire protection rating.

1.03 SYSTEM DESCRIPTION

- A. The extent of each type of door and frame is shown on the drawings and schedules.
- B. The following types of doors and frames are required:
 1. FRP/Aluminum Hybrid flush doors
 2. Aluminum frames.

1.04 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturer's corresponding standard systems according to test methods designated.
- B. Submitted door shall have been manufactured for a minimum of 5 years. List of minimum (100) jobs shall be submitted for architect's review, upon his request.
- C. Air Leakage: Door shall not exceed 0.20 cfm infiltration per square foot when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 or NFRC 400.
- D. Water Resistance: For a single door 3'-0" x 7'-0", test specimen tested in accordance with ASTM E 331 @ 7.50 psf. Door shall have no water leakage.
- E. Thermal Transmission (exterior doors): "U" value of not more than 0.29 (BTU/Hr. x sf x degrees F°) per AAMA 1503.98. Minimum of 55 CRF value.
- F. Surface Burning Characteristics, FRP Door face sheets, ASTM E 84. (Exterior skins only)
 1. Flame Spread: Maximum of 200, Class C.
 2. Smoke Developed: Maximum of 450, Class C.
- G. Flame Spread/Smoke Developed: Class A FRP faces sheets only for interior face of FRP Exterior doors & panels and both faces of FRP Interior doors & panels, ASTM 84 E:
 1. Flame Spread: Not greater than 25.
 2. Smoke Developed: Not greater than 450.
- H. Additional Criteria: Provide FRP doors and panels with the following performance
 1. Impact Strength: ASTM D 256 - Nominal Value, 15.0 foot-pounds per inch of notch.
 2. Water Absorption: ASTM D 570 - Nominal Value, 0.20% after 24 hours.

3. Indentation Hardness: ASTM D 2583 - Nominal Value, 55.
- I. Abrasion Resistance: Face Sheet to have no greater than .029 average weight loss percentage after Taber Abrasion Test - 25 cycles at 1000 gram weight with CS-17 Wheel.
- J. Salt Spray, Exterior Doors & Frames, ASTM B 117: Minimum of 500 hours.
- K. Stain Resistance, ASTM D 1308: Face Sheet unaffected after exposure to red cabbage, tea and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to Sharpie ink pen and white spray paint.
- L. Sound Transmission, Exterior Doors, STC, ASTM E90: Minimum of 25
- M. Chemical Resistance: ASTM D 543 (Excellent)
 1. Acetic Acid, Concentrated.
 2. Ammonium Hydroxide, Concentrated.
 3. Sodium Hypochlorite, 4-6% solution.
 4. Citric Acid, 10% solution.
 5. Hydrochloric Acid, 10%
 6. Sodium Hypochlorite, 4-6% solution.
- N. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
- O. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
- P. Swinging Security Door Assembly, Doors & Frames, ASTM F 476: Grade 40.
- Q. Swinging Door Cycle Test, Doors & Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
- R. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum of 5,000,000 cycles.
- S. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi
- T. Compressive Modulus, foam Core, Nominal Value, ASTM D 1621: 370 psi.
- U. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
- V. Thermal and Humid Aging, Foam Core, Nominal Value, 158 degrees F and 100 % humidity for 14 days, ASTM D 2126: Minus 5.14 % volume change.
- W. Single Flush Door shall have passed following tests: (protection systems such as shutters, canopies or overhangs will not be allowed to pass tests.) Documentation of having passed tests, as performed and documented by an independent testing laboratory, will be required.
 1. Uniform Static Load Test - ASTM E330, Minimum +75 psf and -75 psf design pressures
 2. Forced Entry Resistance Test - SFBC 3603.2 (b) (5), Minimum 300 lbs: Passed
 3. Large Missile Impact Test - Test Conditions PA 201: Passed
 4. Cyclic Load Test - SFBC P.A. 203, Plus or minus 53 psf.
- X. Door shall be marketed by manufacturer as a heavy duty door, appropriate for institutional and school construction subject to heavy usage.
- Y. Design Pressure (DP):
 1. Positive Design Wind Load: 20 psf.
 2. Negative Design Wind Load: 24 psf.

1.05 SUBMITTALS

- A. Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances in full scale, affected related Work and expansion and contraction joint location and details.
 1. Include details of core, stile and rail construction, trim for lites and all other components.
 2. Include details of finish hardware mounting.
- D. Manufacturers Certificate: Certify that products meet or exceed specified requirements.

- E. Test Reports: Furnish ICC Evaluation Report showing compliance with NYS Code, Section 2603.4.1.7 or independent laboratory testing showing compliance with NYS Code, Section 2603.9.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to jobsite in their original, unopened packages with labels intact. Inspect materials for damage and advise manufacturer immediately of any unsatisfactory materials.
- B. Package door assemblies in individual corrugated cartons so no portion of the door has contact with the outer shell of the container. Package and ship frames preassembled to the greatest possible extent.
- C. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

- A. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.09 COORDINATION

- A. Coordinate the Work with installation of air barrier, vapor retarder, and exterior wall components or materials.

1.10 WARRANTY

- A. Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Warrant doors and frames against failure in materials and workmanship, including excessive deflection, faulty operation, and deterioration of finish or construction in excess of normal weathering.
- C. Standard Period: Ten years.
- D. Limited Lifetime: Covers failure of corner joinery, core deterioration, and delamination or bubbling of door skin and corrosion of all-fiberglass products while the door is in its specified application in its original installation.
- E. Finishes:
 - 1. Kynar painted aluminum: 10 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Kawneer North America: www.kawneer.com.
- B. Oldcastle Building Products: www.oldcastlebe.com.
- C. **Special Lite Inc.:** www.special-lite.com.
- D. United States Aluminum: www.usalum.com.

2.02 FRP PEBBLE TEXTURE FLUSH DOORS

- A. Basis of Design: **Special-Lite SL-17** Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Construction:

1. Door Thickness: 1-3/4 inches.
 2. Stiles and Rails: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes, minimum of 2-5/16-inch depth.
 3. Corners: Mitered.
 4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom integral to standard tubular shaped stiles and rails reinforced to accept hardware as specified.
 5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
 6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
 7. Rail caps or other face sheet capture methods are not acceptable.
 8. Extrude top and bottom rail legs for interlocking continuous weather bar.
 9. Meeting Stiles: For pairs of doors manufacturer shall provide and install full height adjustable dual brush astragal on active leaf allowing for seasonal adjustment.
 10. Concealed Adjustable Door Bottom: Door Manufacturer to provide and install SL-301 concealed adjustable dual brush door bottom with up to 0.625 inch of adjustment.
 - a. Automatic door bottoms are not acceptable.
 11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.
- C. Face Sheet:
1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout.
 2. Protective coating: Abuse-resistant engineered surface. Provide FRP with SpecLite3 protective coating, or equal.
 3. Texture: Pebble.
 4. Color: As selected by Architect.
 5. Adhesion: The use of glue to bond face sheet to foam core is prohibited.
 6. Supply Class C exterior face-sheets in accordance with ASTM 84 E. Supply Class A interior face-sheets in accordance with ASTM E84.
- D. Core:
1. Material: Poured-in-place polyurethane foam.
 2. Density: Minimum of 5 pounds per cubic foot.
 3. R-Value: Minimum of 3.45.
 4. Core insulation shall have a flame spread of 75 or less and a smoke developed index of not more than 450.
 5. Provide 0.032 inch aluminum liner between foam core and FRP face sheet per NYS Code, Section 2603.4.1.7, if standard door construction does not pass independent testing outlined in Section 2603.9.
- E. Cutouts:
1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
 2. Factory install vision lites, louvers, and panels.
- F. Hardware:
1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.

2.03 FRP CLAD FIRE-RATED DOORS

- A. SL-17FR Pebble Grain Fire-Rated Fiberglass Door.
 1. Rated for 20 to 90 min maximum duration.
- B. Door Opening Size.
 1. 4'0" x 8'0" maximum size single swing.
- C. Construction.
 1. Door Thickness.

- a. 1-7/8" at door edge.
- 2. Stiles.
 - a. Single Swing:
 - 1) Hinge and lock stile, 2" minimum tectonite.
- 3. Rails.
 - a. Top rail, 6" minimum tectonite.
 - b. Bottom rail, 4" minimum for single swing, 4-1/2" minimum for pairs tectonite.
- 4. Core.
 - a. WSCP-412 proprietary mineral core.
 - b. 1-1/2" nominal thickness.
 - c. 18 pcf minimum density.
- 5. Face Sheet.
 - a. Exterior
 - 1) 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - 2) Optional painted finish consult manufacturer.
 - 3) Class C standard.
 - b. Interior
 - 1) 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.
 - 2) Optional painted finish consult manufacturer.
 - 3) Class C standard optional Class A available consult manufacturer.
- 6. Edge Channels.
 - a. 0.062" thick, 3/4" leg, stainless steel edge channel.
 - b. Applied to entire perimeter of the door.
 - c. Sealed by 3M CP 25WB + Fire Barrier caulk applied to the inside edges of all the steel edge channels.
- 7. Hardware.
 - a. Pre-machine doors in accordance with templates from specified hardware manufacturers.
 - b. Field apply factory supplied gaskets and seals, full width intumescent and smoke seal required at top of door, smoke seals required on both jambs.

2.04 MATERIALS

- A. Aluminum Members:
 - 1. Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes: ASTM B 221.
 - 2. Sheet and Plate: ASTM B 209.
 - 3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.
- B. Components: Door and frame components from same manufacturer.
- C. Fasteners:
 - 1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
 - 2. Compatibility: Compatible with items to be fastened.
 - 3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.05 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.
- B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.
- C. Assembly:

1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
 2. Remove burrs from cut edges.
- D. Welding: Welding of doors or frames is not acceptable.
- E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
 2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.06 ALUMINUM FRAMING SYSTEM

- A. Tubular Framing:
1. Frame: Model SL-600TB Thermally Broken 2 inch by 6 inch as indicated on drawings.
 2. Material: Aluminum extrusions, ASTM B221, Alloy 6063-T6.
 3. Jambs, Mullions, Sills, Horizontal Intermediates, and Headers: 0.080-inch wall thickness.
 4. Lock Jambs, Hinge Jambs and Door Headers: 0.125-inch wall thickness, box type with four enclosed sides, 2 inch by 6 inch factory fabricated. Heavy-duty internal joint anchors shall be supplied. Open-back framing is not acceptable.
 5. Thermal Break: Fiberglass pultrusion thermal strut and pocket filler.
 6. Applied Door Stops: 0.625" high screw applied with integral weatherstrip. Wall thickness to be 0.125 inch. Reinforce at closer arm location with 1/2 inch aluminum bar stock for secure hardware attachment. Counterpunch fastener holes in the door stop to preserve full metal thickness under fastener head. Snap in blade stops are not acceptable.
 7. Caulk joints before assembling frame members. Secure joints with fasteners and provide a hairline butt joint appearance. Prefit doors to frame assembly and factory prior to shipment. Field fabrication of framing using "stick" material is not acceptable.
 8. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and the approved hardware schedule.
 9. Install with anchors appropriate for wall conditions to anchor framing to wall materials. Anchors shall be 24-inches on center maximum. Secure head and sill members of transom, sidelites and similar conditions.
 10. Factory preassemble frames and mark frame assemblies according to location.

2.07 FIBERGLASS FIRE-RATED FRAMING SYSTEM

- A. FR-Series Fiberglass Framing.
1. Maximum of 45 min fire rating when installed in fiberglass frames.
 2. Materials.
 - a. 1/4" thick, solid, pultruded, FRP profiles.
 - b. No corrosive components or reinforcements.
 - c. Solid tectonite filler.
 - d. No steel or aluminum filler is allowed.
 3. Perimeter Frame Members.
 - a. Factory fabricated.
 - b. Integral 5/8" x 2-1/4" doorstop.
 - c. Mitered with 4" x 4" x 3/8" pultruded FRP angle reinforcement with interlocking pultruded FRP brackets.
 - d. 5-3/4", 6-3/4", 7-3/4", or 8-3/4" jamb depth.
 - e. 2" face on jambs.
 - f. 2" or 4" face on header.
 - g. Knocked down for field assembly.
 4. Anchors
 - a. Factory furnished as recommended by manufacturer.

2.08 COMPONENTS

- A. Extruded Aluminum: Alloy and temper as recommended by manufacturer for strength, corrosion resistance and application of required finish and control of color; ASTM B 221 for extrusions,

ASTM B 209 for Sheet and Plate.

- B. Furnish door and frame components from the same manufacturer. "Splitting" of door and frame components is not permitted
- C. Fasteners: Aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, anchors and other items being fastened. For exposed fasteners (if required) provide Phillips head screws with finish matching the item to be fastened.
- D. Glazing gaskets: For glazing factory-installed glass, and for gaskets, which are factory - installed in "captive" assembly of glazing stops, manufacturer's standard stripping of molded neoprene, complying with ASTM D2000 (designation 2BC415 to 3BC620), or molded PVC complying with ASTM C 509 Grade 4.
- E. Hardware: Furnished under section 08 71 00 as scheduled unless indicated otherwise.
- F. Sizes and Profiles: The required sizes for door and frame units, and profile requirements are shown on the drawings.
- G. Coordination of Fabrication: Field measure before fabrication, and show recorded measurements on final shop drawings.
- H. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to assembly. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- I. No welding of doors or frames is acceptable.
- J. Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support at mechanical joints, with hairline fit at contacting members.
- K. Complete fabrication, assembly, finishing and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.

2.09 SHOP FINISHING

- A. Painted Aluminum Surfaces: AA-M12C12R1x non-specular as fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
 - 1. High Performance Organic Coating: Fluoropolymer coating system complying with AAMA 2604 or 2605 minimum two-coat, with minimum 70 percent polyvinylidene fluoride resin.
 - 2. Color: As selected by Architect.
- B. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other Work.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

3.02 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- 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. Coordinate attachment and seal of perimeter air and vapor retarder materials.

- G. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Set thresholds in bed of mastic and secure.
- I. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- J. Coordinate installation of perimeter sealants with Section 07 92 00.
- K. Provide Owner with all adjustment tools and instruction sheets. Arrange an in-service session to Owner at Owner's convenience. Provide a minimum one-year written warranty on all labor related to this section. Any workmanship which is defective or deficient shall be corrected to the Owner's satisfaction and at no additional cost to the Owner.

3.03 ADJUSTING

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.
 - 1. Maximum distance from bottom of door to top of threshold: 1/4 inch.

3.04 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

3.05 PROTECTION

- A. Protect products of this section from damage caused by subsequent construction until substantial completion.
- B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

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**SECTION 08 31 00
ACCESS DOORS AND PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall- and ceiling-mounted access units.

1.02 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.
- D. Project Record Documents: Record actual locations of each access unit.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Wall-Mounted Units:
 - 1. Panel Material: Steel.
 - 2. Sizes:
 - a. 12 x 12 inches where easily accessible to items above.
 - b. 18 x 18 inches where partial person access is required.
 - c. 24 x 24 inches where entire person access is required.
 - 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.
- B. Fire-Rated Wall-Mounted Units:
 - 1. Wall Fire-Rating: As indicated on drawings.
 - 2. Panel Material: Steel.
 - 3. Size: 12 by 12 inches.
 - 4. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- C. Ceiling-Mounted Units:
 - 1. Panel Material: Steel.
 - 2. Sizes:
 - a. 12 x 12 inches where easily accessible to items above.
 - b. 18 x 18 inches where partial person access is required.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 WALL- AND CEILING-MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. ACUDOR Products Inc: www.acudor.com.
 - 2. Babcock-Davis: www.babcockdavis.com.
 - 3. Karp Associates, Inc: www.karpinc.com.
 - 4. Nystrom, Inc: www.nystrom.com.
- 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. Door Style: Single thickness with rolled or turned in edges.
2. Frames: 16-gauge, 0.0598-inch minimum thickness.
3. 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.
4. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - c. Latch/Lock: Screw driver slot for quarter turn cam latch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and infill panels.

1.02 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2017.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- E. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- K. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- L. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants; 2023.
- M. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- N. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.
- O. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants; 2019.
- P. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2023.
- Q. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications; 2018 (Reapproved 2023).
- R. ASTM C1401 - Standard Guide for Structural Sealant Glazing; 2023.
- S. 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.
- T. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- U. NFRC-100 - Procedure for Determining Fenestration Product U-factors.
- V. NFRC-200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

W. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.03 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.

1.04 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, internal drainage details, glazing, and infill.
- 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. Shop Drawings: Provide details of proposed structural sealant glazing (SSG) and weather sealant joints indicating dimensions, materials, bite, thicknesses, profile, and support framing.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- G. 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.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Verify that each component is appropriate for use in structural sealant glazing (SSG) application in regards to at least the following properties: size, shape, dimensions, material, durability, storage conditions, and color.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience and approved by manufacturer.

1.06 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.

1.07 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with installer.
- C. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.
- D. Extended Correction Period: Correct defective work within 5-year period commencing on the date of substantial completion.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN - CURTAIN WALL SYSTEMS

- A. Four (4)-Sided Structural Sealant Glazing (SSG):
 - 1. Basis of Design: EFCO, a Pella Company; System 5600, 2-1/4 inch wide face: www.efcocorp.com.
- B. Other Manufacturers: Provide either product identified as "Basis of Design" or an equivalent product of another manufacturer.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Structural sealant glazing (SSG) adhesive on four (4)-sides.
 - 2. Fabrication Method: Either shop/factory or field fabricated system.
 - 3. Glazing Method: Either shop/factory or field glazed system.
 - 4. Finish: Class I color anodized.
 - a. Factory finish surfaces that will be exposed in completed assemblies.
 - b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 - 5. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 - 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 - 7. 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.
 - 8. 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.
 - 9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
 - 1. Design Wind Loads: Comply with the following:
 - a. Positive Design Wind Load: +20 lbf/sq ft.
 - b. Negative Design Wind Load: -24 lbf/sq ft.
 - c. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
 - d. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
 - e. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of

- span plus 1/4 inch, with full recovery of glazing materials.
2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
 4. Structural Sealant Glazing (SSG) System: For individual glass lites, design framing members to not exceed a deflection normal to the wall of L/175 between supports with 3/4 inch maximum, and a deflection parallel to the wall of L/360 with 1/8 inch maximum, whichever is less.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
1. Test Pressure Differential: 15 psf.
 2. Test Method: AAMA 501.1.
- D. Air Leakage: 0.06 cfm/sq ft maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.24 psf pressure difference across assembly.
- E. Thermal Performance Requirements:
1. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
 2. Overall U-value Including Glazing: 0.36 Btu/(hr sq ft deg F), maximum.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Cross-Section: As indicated on drawings.
 2. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Aluminum Doors: Swinging doors, glazed, thermally broken.
1. Basis of Design: EFCO, D502 series, wide stile.
 2. Thickness: 2 inches.
 3. Top Rail: 5 inches wide.
 4. Vertical Stiles: 5 inches wide.
 5. Bottom Rail: 10 inc
 6. Finish: Same as curtainwall.
 7. Hardware:
 - a. For each door, include weatherstripping and continuous hinge.
 - b. Other Door Hardware: As specified in Section 08 71 00.
 - c. Weatherstripping: Wool pile, continuous and replaceable.
 - d. Continuous Hinge: SL12HD by EFCO, finish to match door, factory installed.
- C. Glazing: See Section 08 80 00.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- C. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- D. Structural Sealant Glazing (SSG) Adhesive: Neutral curing, silicone sealant formulated for SSG applications in compliance with ASTM C1184 and structural glazing industry guidelines,

ASTM C1401.

1. SSG adhesive in compliance with ASTM C920; Type S - Single-component, Grade NS, Class 50, Use NT, G, and A.
 2. Ultimate Tensile Strength: Minimum of 50 psi as determined by test method ASTM C1135 under the following conditions.
 - a. Exposure to air temperatures of 190 degrees F and minus 20 degrees F.
 - b. Water immersion for seven (7) days, minimum.
 - c. Exposure to weathering for 5,000 hours, minimum.
 3. Sealant Design Tensile Strength: 20 psi, maximum.
 4. Hardness: 20 to 60 with Type A-2 durometer in compliance with test method ASTM C661.
 5. Color: Black.
 6. SSG sealant tested for compatibility with glazing accessories in compliance with ASTM C1087, tested for accelerated weathering in compliance with ASTM C793, and in compliance with insulating glass secondary sealant design standards of ASTM C1249.
- E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- F. Glazing Accessories: See Section 08 80 00.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.05 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.
- B. Color: Dark bronze.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain 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. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet noncumulative or 0.5 inches per 100 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.

3.05 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.

END OF SECTION

**SECTION 08 51 13
ALUMINUM WINDOWS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Extruded aluminum windows with fixed sash and operating sash.
- B. Factory glazing.
- C. Operating hardware.
- D. Insect screens.

1.02 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, framed opening tolerances, 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. 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.
- G. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.
- H. Specimen warranty.

1.03 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 type specified and with at least three years of documented experience and approved by manufacturer.

1.04 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.

1.05 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 10-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.
- C. Manufacturer Warranty: Provide 3 -year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 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. Horizontal Sliding; with Matching Fixed Units:
 - 1. Basis of Design: EFCO, a Pella Company; SX45 Series, 4-1/2 inch deep frame; one sash fixed, one sliding: www.efcocorp.com.
- C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another manufacturer.

2.02 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. Operable Units: Double weatherstripped.
 - 2. Provide factory-glazed units.
 - 3. 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.
 - 4. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 - 5. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
 - 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. 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.
- B. Horizontal Sliding Type:
 - 1. Construction: Thermally broken.
 - 2. Provide screens.
 - 3. Glazing: Double; clear; low-e.
 - 4. Exterior Finish: Class I color anodized.
 - 5. Interior Finish: Class I color anodized.

2.03 PERFORMANCE REQUIREMENTS

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 - 1. Performance Class (PC): AW.
- B. Design Pressure (DP):
 - 1. Positive Design Wind Load: 20 psf.
 - 2. Negative Design Wind Load: 24 psf.

- C. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- D. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.
- E. Air Leakage: 0.1 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 6.27 psf pressure difference in accordance with ASTM E283/E283M.
- F. Condensation Resistance Factor of Frame: 50, measured in accordance with AAMA 1503.
- G. The maximum U-Value for units is to be 0.43 for operable units and 0.36 for fixed units per the Energy Conservation Construction Code of New York State.

2.04 COMPONENTS

- A. Frames: 2 inch wide by 4 1/2 inch deep profile, of 0.080 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.
- B. Glazing: See Section 08 80 00.
- C. Sills: 0.094 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.
- E. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.
- F. Fasteners: Stainless steel.
- G. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.
- H. All Sliding windows shall have equal sightline between the fixed and operable sash. Sliding sash that add sightline to the unit are not acceptable.

2.05 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H12 or H14 temper.
- C. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A123/A123M.

2.06 HARDWARE

- A. Sash lock: Lever handle with cam lock.
- B. Operating hardware at rescue windows shall be a maximum of 54 inches above the floor.

2.07 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42, integrally colored anodic coating not less than 0.7 mil thick.
- B. Finish Color: Dark bronze.
- C. Operator and Exposed Hardware: Enameled to color as selected from manufacturer's standard line.
- D. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.
- E. Shop and Touch-Up Primer for Steel Components: SSPC-Paint 25 zinc oxide alkyd linseed oil primer.

- F. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 25 00.

3.02 PRIME WINDOW INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Install window assembly in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
- C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- E. Install sill and sill end angles.
- F. Set sill members and sill flashing in continuous bead of sealant.
- G. 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.
- H. Install operating hardware not pre-installed by manufacturer.

3.03 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.

3.04 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 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. 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 SECTION INCLUDES

- A. Hardware for wood, aluminum, and FRP doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Thresholds.
- E. Weatherstripping and gasketing.

1.02 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. BHMA A156.1 - Standard for Butts and Hinges; 2021.
- C. BHMA A156.2 - Bored and Preamsembled Locks and Latches; 2022.
- D. BHMA A156.3 - Exit Devices; 2020.
- E. BHMA A156.4 - Door Controls - Closers; 2019.
- F. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.
- G. BHMA A156.6 - Standard for Architectural Door Trim; 2021.
- H. BHMA A156.7 - Template Hinge Dimensions; 2016.
- I. BHMA A156.16 - Auxiliary Hardware; 2023.
- J. BHMA A156.21 - Thresholds; 2019.
- K. BHMA A156.22 - Standard for Gasketing; 2021.
- L. BHMA A156.31 - Electric Strikes and Frame Mounted Actuators; 2019.
- M. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- N. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
- O. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.
- P. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- Q. ITS (DIR) - Directory of Listed Products; Current Edition.
- R. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- T. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- V. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- W. UL (DIR) - Online Certifications Directory; Current Edition.
- X. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Y. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- D. Convey Owner's keying requirements to manufacturer's.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Hardware Suppliers Qualifications: Submit verification that hardware submittals have been prepared by a DHI certified Architectural Hardware Consultant (AHC) or a DHI certified Door & Hardware Consultant (DHC). When applicable, submit verification that electrified hardware has been prepared by a DHI certified Electrified Hardware Consultant (EHC).
- C. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- D. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
 - 3. List groups and suffixes in proper sequence.
 - 4. Provide complete description for each door listed.
 - 5. Include account of abbreviations and symbols used in schedule.
- E. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
 - 2. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
 - 3. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Keying Schedule: Submit to Owner for approval.
- H. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- I. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Lock Cylinders: Two for each master keyed group.
 - 3. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

1.05 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 for commercial door hardware with at least three years of documented experience.

- C. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) to assist in work of this section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.
- B. Deliver keys to Owner with identifying tags, by secure shipment, directly from the hardware supplier.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
 - 1. Closers: Twenty-five years, minimum.
 - 2. Exit Devices: Three years, minimum.
 - 3. Locksets and Cylinders: Seven years, minimum.
 - 4. Other Hardware: One year, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. Accessibility: ADA Standards and ICC A117.1.
 - 3. Applicable provisions of NFPA 101.
 - 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 - 5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR) or ITS (DIR) as suitable for application indicated.
 - 6. Hardware for Smoke and Draft Control Doors (all fire-rated doors): Provide door hardware that complies with local codes, and requirements of assemblies tested in accordance with UL 1784.
 - a. Air Leakage Rate: Tested in accordance with UL 1784, with air leakage rate not to exceed 3.0 cfm/sf of door opening at 0.10 inch of water for both ambient and elevated temperature tests.
 - 7. Auxiliary Hardware: BHMA A156.16.
 - 8. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 - 9. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
 - 10. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- D. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
 - 1. See Section 28 10 00 for additional access control system requirements.
- E. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. See Door Hardware Schedule.
- F. Fasteners:

1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.
3. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.
4. Provide sex bolts for attachment of closers and vertical rod exit devices on wood doors.

2.02 HINGES

- A. Manufacturers:
 1. McKinney; an Assa Abloy Group company; T4A3786: www.assaabloydss.com.
 2. Bommer Industries, Inc; BB5004: www.bommer.com.
 3. Hager Companies; BB1168: www.hagerco.com.
 4. Ives, an Allegion brand; 5BB1HW: us.allegion.com/us.
 5. Stanley, dormakaba Group; FBB 168: www.stanleyhardwarefordoors.com.
- B. Hinges: Comply with BHMA A156.1, Grade 1.
 1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
 - a. Provide hinge width required to clear surrounding trim.
 2. Provide hinges on every swinging door.
 3. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 4. Provide ball-bearing hinges at each door with closer.
 5. Provide following quantity of butt hinges for each door:
 - a. Doors From 60 inches High up to 90 inches High: Three hinges.

2.03 CONTINUOUS GEARED HINGES

- A. Manufacturers:
 1. Assa Abloy McKinney; MCK-25HD: www.assaabloydss.com.
 2. Assa Abloy Pemko; FMHD: www.assaabloydss.com.
 3. Ives; 224HD: us.allegion.com.
 4. Roton; 24HD: www.hagerco.com.
 5. Select Products; SL-24HD: www.select-hinges.com.
- B. Continuous Hinges: Comply with BHMA A156.26.

2.04 FLUSH BOLTS

- A. Flush Bolts: Comply with BHMA A156.16, Grade 1.
 1. Flush Bolt Throw: 3/4 inch, minimum.
 2. Provides extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
 - a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
 3. Self-Latching Flush Bolts: Automatically latch upon closing of door; manually retracted; located on inactive leaf of pair of doors.

2.05 EXIT DEVICES

- A. Manufacturers:
 1. Corbin Russwin; an Assa Abloy Group company; ED5000: www.assaabloydss.com.
 2. Sargent; an Assa Abloy Group company; 80 Series: www.assaabloydss.com.
 3. Precision, dormakaba Group; Apex 2000 Series: www.precisionhardware.com.

4. Von Duprin, an Allegion brand; 98 Series: www.allegion.com/us.
- B. Exit Devices: Comply with BHMA A156.3, Grade 1.
 1. Lever design to match lockset trim.
 2. Provide cylinder with cylinder dogging or locking trim.
 3. Provide exit devices properly sized for door width and height.
 4. Provide strike as recommended by manufacturer for application indicated.
 5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.06 ELECTRIC STRIKES

- A. Manufacturers:
 1. Adams Rite, HES, or Securitron; an Assa Abloy Group company: www.assaabloydss.com.
- B. Electric Strikes: Comply with BHMA A156.31, Grade 1.
 1. Provide UL (DIR) listed burglary-resistant electric strike; style to suit locks.
 2. Provide non-handed 12/24 VDC electric strike suitable for door frame material and scheduled lock configuration.
 3. Provide field selectable Fail Safe/Fail Secure modes.
 4. Provide transformer and rectifier as necessary for complete installation.

2.07 LOCK CYLINDERS

- A. Manufacturers:
 1. Best, dormakaba Group: www.bestaccess.com.
- B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 1. Provide small format interchangeable core (SFIC) type cylinders, Grade 1, with seven-pin core in compliance with BHMA A156.5 at locations indicated.
 2. Provide cylinders from same manufacturer as locking device.
 3. Provide cams and/or tailpieces as required for locking devices.

2.08 CYLINDRICAL LOCKS

- A. Manufacturers:
 1. Corbin Russwin; an Assa Abloy Group company; CL3300: www.assaabloydss.com.
 2. Assa Abloy Sargent; 10 Line: www.assaabloydss.com.
 3. Best, dormakaba Group; 9K Series: www.bestaccess.com.
 4. Schlage, an Allegion brand; ND Series: www.allegion.com/us.
- B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.
 1. Bored Hole: 2-1/8 inch diameter.
 2. Latchbolt Throw: 1/2 inch, minimum.
 3. Backset: 2-3/4 inch unless otherwise indicated.
 4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
 - a. Finish: To match lock or latch.
 - b. Aluminum-Frame Strike Box: Provide strike box fabricated for use with aluminum framing by framing manufacturer.
 5. Provide a lock for each door, unless otherwise indicated that lock is not required.
 6. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.

2.09 DOOR PULLS AND PUSH PLATES

- A. Manufacturers:
 1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 2. Burns Architectural Hardware: www.burnsmfg.com.
 3. Hager Companies: www.hagerco.com.
- B. Door Pulls and Push Plates: Comply with BHMA A156.6.
 1. Pull Type: Straight, unless otherwise indicated.

2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
 - a. Edges: Beveled, unless otherwise indicated.
3. Material: Aluminum, unless otherwise indicated.
4. On glazed storefront doors, provide matching door pulls/push plates on both faces unless otherwise indicated.

2.10 CLOSERS

- A. Manufacturers; Surface Mounted:
 1. Corbin Russwin; an Assa Abloy Group company; DC8000: www.assaabloydss.com.
 2. Sargent; an Assa Abloy Group company; 281 Series: www.assaabloydss.com.
 3. LCN, an Allegion brand; 4040XP: www.allegion.com/us.
- B. Closers: Comply with BHMA A156.4, Grade 1.
 1. Type: Surface mounted to door.
 2. Material: Cast-iron cylinder body.
 3. Provide door closer on each exterior door.
 4. Provide door closer on each fire-rated and smoke-rated door.
 5. At outswinging exterior doors, mount closer on interior side of door.
 6. Provide drop plate where back of closer is exposed to view.
 7. Provide brackets where required by frame condition.

2.11 WALL STOPS

- A. Manufacturers:
 1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 2. Hager Companies: www.hagerco.com.
 3. Ives, an Allegion brand: www.allegion.com/us.
- B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
 1. Provide wall stops to prevent damage to wall surface upon opening door.
 2. Type: Bumper, concave, wall stop.
 3. Material: Aluminum housing with rubber insert.

2.12 THRESHOLDS

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 2. National Guard Products, Inc: www.ngpinc.com.
 3. Zero International, Inc: www.zerointernational.com.
- B. Thresholds: Comply with BHMA A156.21.
 1. Provide threshold at each exterior door, unless otherwise indicated.
 2. Type: Flat surface.
 3. Material: Aluminum.
 4. Threshold Surface: Thermally broken.
 5. Field cut threshold to profile of frame and width of door sill for tight fit.
 6. Provide non-corroding fasteners at exterior locations.

2.13 WEATHERSTRIPPING AND GASKETING

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 2. National Guard Products, Inc: www.ngpinc.com.
 3. Zero International, Inc: www.zerointernational.com.
- B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
 1. Head and Jamb Type: Self-adhesive.
 2. Door Sweep Type: Door shoe with drip cap.
 3. Material: Aluminum, with brush weatherstripping.

4. Provide gasketing for smoke and draft control doors (all fire-rated doors) that complies with local codes, requirements of assemblies tested in accordance with UL 1784.
5. Provide door bottom sweep on each exterior door, unless otherwise indicated.

2.14 FINISHES

- A. Finishes: Identified in Section 08 0671 - Door Hardware Schedule.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Install hardware for smoke and draft control doors in accordance with NFPA 105.
- D. Use templates provided by hardware item manufacturer.
- E. Do not install surface mounted items until application of finishes to substrate are fully completed.
- F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 FIELD QUALITY CONTROL

- A. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

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**SECTION 08 80 00
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- L. GANA (GM) - GANA Glazing Manual; 2022.
- M. GANA (SM) - GANA Sealant Manual; 2008.
- N. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.
- O. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- P. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.
- Q. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
- R. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

1.03 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 one sample 12 by 12 inch in size of glass units.

- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.05 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.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com.
 - 2. Guardian Glass, LLC: www.guardianglass.com.
 - 3. Pilkington North America Inc: www.pilkington.com/na.
 - 4. Saint Gobain North America: www.saint-gobain.com.

2.02 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: Calculated in accordance with ASCE 7.
 - 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.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
 5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.04 INSULATING GLASS UNITS

- A. Manufacturers:
 1. Glass: Any of the manufacturers specified for float glass.
- B. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
- C. Insulating Glass Units: Types as indicated.
 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 3. Warm-Edge Spacers: Low-conductivity thermoplastic with desiccant warm-edge technology design.
 - a. Spacer Width: As required for specified insulating glass unit.
 - b. Spacer Height: Manufacturer's standard.
 4. Spacer Color: Black.
 5. Edge Seal:
 - a. Single-Sealed System: Provide silicone, polysulfide, or polyurethane sealant as seal applied around perimeter.
 - b. Color: Black.
 6. Purge interpane space with dry air, hermetically sealed.
- D. Type IG-1 - Tinted Insulating Glass Units: Vision glass, double glazed.
 1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with air.
 3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Bronze.
 - b. Coating: Guardian SN68, on #2 surface.
 4. Warm-edge spacer.
 5. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Guardian SG IS20, on #4 surface.
 6. Total Thickness: 1 inch.
 7. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
 8. Visible Light Transmittance (VLT): 33 percent, nominal.
 9. Solar Heat Gain Coefficient (SHGC): 0.24, nominal.
 10. Glazing Method: Dry glazing method, gasket glazing.

- E. Type IG-2 - Clear Insulating Glass Units: Vision glass, double glazed.
 - 1. Applications: Window type A.
 - 2. Space between lites filled with air.
 - 3. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Guardian SN68, on #2 surface.
 - 4. Warm-edge spacer.
 - 5. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Guardian SG IS20, on #4 surface.
 - 6. Total Thickness: 1 inch.
 - 7. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
 - 8. Visible Light Transmittance (VLT): 33 percent, nominal.
 - 9. Solar Heat Gain Coefficient (SHGC): 0.24, nominal.
 - 10. Glazing Method: Dry glazing method, gasket glazing.
- F. Type IG-3 - Insulating Glass Units: Spandrel glazing.
 - 1. Applications: Exterior spandrel glazing unless otherwise indicated.
 - 2. Space between lites filled with air.
 - 3. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
 - a. Tint: Bronze.
 - b. Coating: Same as on vision units, on #2 surface.
 - 4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
 - a. Tint: Clear.
 - b. Opacifier: Ceramic frit, on #4 surface.
 - c. Opacifier Color: Bronze.
 - 5. Total Thickness: 1 inch.
 - 6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.

2.05 GLAZING UNITS

- A. Type G-1 - Monolithic Safety Glazing: Non-fire-rated.
 - 1. Applications:
 - a. Glazed lites in doors, except fire doors.
 - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
 - c. Other locations required by applicable federal, state, and local codes and regulations.
 - d. Other locations indicated on drawings.
 - 2. Glass Type: Fully tempered safety glass as specified.
 - 3. Tint: Clear.
 - 4. Thickness:
 - a. 3/8 inch at office glass partitions & as required by GANA Glazing Manual.
 - b. 1/4 inch at all other locations.

2.06 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Polysulfide Sealant: Two component; chemical curing, nonsagging type; ASTM C920 Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- C. Polyurethane Sealant: Single component, chemical curing, nonstaining, nonbleeding; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.
- D. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A,

and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.07 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 - 1. Width: As required for application.
 - 2. Thickness: As required for application.
 - 3. Spacer Rod Diameter: As required for application.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 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.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - STRUCTURAL SILICONE GLAZING

- A. See Section 08 44 13 for wall framing assembly requirements.
- B. Application - Factory (Shop) Glazed: Follow basic guidelines of structural silicone glazing for glazing application.
 - 1. Two-Sided Structural: Glass structurally adhered to vertical mullions with horizontal sides captured in glazing pockets.
- C. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.
- D. Provide only structural silicone sealant, tested and manufactured for structural glazing.

3.06 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.

3.07 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 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 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 existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Patching compound.
- F. Remedial floor coatings.

1.02 RELATED REQUIREMENTS

- A. Section 01 22 00 - Unit Prices: Bid pricing for remediation treatments if required.

1.03 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens); 2021.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.
- C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- D. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- E. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2018.

1.04 SUBMITTALS

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. 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.
- C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 - 1. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
 - 2. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
 - 3. Manufacturer's installation instructions.
- D. Floor Skim Coat Product Data: Manufacturer's published data on product to be used for skim coat of existing slabs.
- E. Testing Agency's Report:
 - 1. Description of areas tested; include floor 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. Submit report directly to Owner.
 7. Submit report not more than two business days after conclusion of testing.
- F. Adhesive Bond and Compatibility Test Report.
- G. Copy of RFCI (RWP).

1.05 QUALITY ASSURANCE

- A. Moisture and alkalinity (pH) testing will be performed by an independent testing agency employed and paid by Owner.
- B. 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 Owner when specified ambient conditions have been achieved and when testing will start.
- C. 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.

1.06 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.

1.07 FIELD CONDITIONS

- A. 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.
- B. 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

2.01 MATERIALS

- A. Patching (Skim Coat) 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: 3500 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.
 - b. CMP Specialty Products; Prepstar: www.cmpsp.com.
 - c. LATICRETE International, Inc; SKIM LITE: www.laticrete.com.
- B. Remedial Floor Coating: Single- or multi-layer 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. Thickness: 1/8 inch, maximum.
2. Products:
 - a. ARDEX Engineered Cements; Ardex MC Rapid with ARDEX V 1200 Self-Leveling Underlayment: www.ardexamericas.com.
 - b. CMP Specialty Products; Lockdown with Level-1 underlayment: www.cmpsp.com.
 - c. LATICRETE International, Inc; LATICRETE NXT Vapor Reduction Coating with LATICRETE NXT Level Plus: www.laticrete.com.

PART 3 EXECUTION

3.01 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 and as specified.
 8. Skim coat 100% of all existing concrete slabs scheduled to receive a new floor finish.
 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: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane 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.

3.02 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.

3.03 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.

3.04 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 7 pounds per 1,000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.05 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.

3.06 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. 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.

3.07 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Contractor shall prepare new and existing floor surfaces as necessary and as required to provide 100 percent guarantee of new flooring.
- C. Comply with requirements and recommendations of floor covering manufacturer.
- D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
 - 1. Provide skim coat of patching compound over 100 percent of all existing concrete floors scheduled to receive new floor finish.
- E. Do not fill expansion joints, isolation joints, or other moving joints.

3.08 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.09 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

3.10 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

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**SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 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.

1.02 REFERENCE STANDARDS

- A. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- G. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- H. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
- I. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- J. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.
- K. 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; 2022.
- L. 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; 2022.
- M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- N. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- O. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
- P. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018 (Reapproved 2023).
- Q. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

- R. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- S. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
- T. GA-600 - Fire Resistance and Sound Control Design Manual; 2021.
- U. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on metal framing, gypsum board, accessories, and joint finishing system.
 - 2. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- B. Documents at Project Site: Maintain at the project site a copy of manufacturer's instructions, erection drawings, shop drawings, and reference standard documents containing execution requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.
- B. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
 - 1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
 - 2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
 - 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
 - 2. Marino: www.marinoware.com.
 - 3. Phillips Manufacturing Co: www.phillipsmfg.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/120 at 5 psf.
 - 1. Minimum Framing Thickness:
 - a. Wall Height 0 feet to 20 feet: 20 gauge/0.030 inches/30 mils.
 - 2. Studs: C-shaped with knurled or embossed faces.
 - 3. Runners: U shaped, sized to match studs.
 - 4. Ceiling Channels: C-shaped.

5. Flexible Track: Flexible framing consisting of adjustable leg straps and pivoting, hinged track brackets designed to provide curved framing assemblies of varying radii.
 - a. Dimensions: 3-5/8 inches deep by 1-3/16 inches high in lengths and configurations indicated.
6. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
7. Furring Members: Zee-shaped sections, minimum depth of 1 inch.
- D. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and screwed to secondary deflection channel set inside but unattached to top track.
- E. 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.
- F. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 1. CertainTeed Corporation: www.certainteed.com.
 2. Georgia-Pacific Gypsum: www.gpgypsum.com.
 3. National Gypsum Company: www.nationalgypsum.com.
 4. USG Corporation: www.usg.com.
- 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 soffits, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. 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.
 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Soffits: 5/8 inch.
 5. Mold-Resistant, Paper-Faced Products:
 - a. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com.
 - b. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: www.gpgypsum.com.
 - c. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com.
 - d. USG Corporation; USG Sheetrock Brand EcoSmart Panels Mold Tough Firecode X: www.usg.com.
- C. Backing Board For Wet Areas:
 1. Application: Surfaces behind tile in wet areas including toilet rooms.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Regular Type: Thickness 1/2 inch.
 - b. Products:
 - 1) CertainTeed Corporation; 1/2" GlasRoc Tile Backer: www.certainteed.com.

- 2) National Gypsum Company; Gold Bond eXP Tile Backer:
www.nationalgypsum.com.
 - 3) USG Corporation; Durock Brand Glass-Mat Tile Backerboard 1/2 in. (12.7 mm):
www.usg.com.
- D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
 2. Thickness: 1/2 inch.
 3. Edges: Tapered.
 4. Products:
- E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 4. Core Type: Regular.
 5. Regular Board Thickness: 1/2 inch.
 6. Edges: Square.
 7. Glass Mat Faced Products:
 - a. CertainTeed Corporation; GlasRoc 1/2" Exterior Sheathing: www.certainteed.com.
 - b. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com.
 - c. National Gypsum Company; Gold Bond eXP Sheathing: www.nationalgypsum.com.
 - d. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing:
www.usg.com.

2.04 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness 3 1/2 inch.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Water-Resistive Barrier: See Section 07 25 00.
- D. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
1. Types: As detailed or required for finished appearance.
 2. Special Shapes: In addition to conventional corner bead and control joints, provide Tear-Away L Bead at exposed panel edges and at all locations where GWB abuts dissimilar material.
 - a. U-bead will not be permitted.
 - b. Exposed trim pieces will not be permitted.
 3. Products:
 - a. Same manufacturer as framing materials.
- E. 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.
- 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C1007/AISI S220 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members at 16 inches on center.
 - 1. Laterally brace entire suspension system.
 - 2. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches on center.
 - 1. Extend partition framing to structure in all 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.
- D. Brace stud framing system rigid. Install continuous 3/4 inch stiffeners in walls. Secure with clip angles and screws. Space stiffeners according to the following schedule:
- E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- F. 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. Other locations required for proper support.

3.03 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.

3.04 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- C. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- D. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

3.05 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 on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.

- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 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. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - a. Walls that will be concealed behind cabinetry, display boards, or other accessories shall receive the same finish as adjacent surfaces.
 - 2. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. 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.
 - 2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 - 3. Taping, filling, and sanding are not required at base layer of double-layer applications.
- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.08 PROTECTION

- A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

**SECTION 09 30 00
TILING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Non-ceramic trim.

1.02 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
- B. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2019.
- C. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- D. 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 (Reapproved 2023).
- E. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2024.
- F. TCNA (HB-GP) - Handbook for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs Installation; 2023.

1.03 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. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Installer's Qualification Statement:
- 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. Extra Tile: 2 percent of each size, color, and surface finish combination, but not less than 1 box of each type.

1.04 QUALITY ASSURANCE

- A. Maintain one copy of ANSI A108/A118/A136, TCNA (HB), and TCNA (HB-GP) on-site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

- A. Manufacturers: All products by the same manufacturer.
 - 1. American Olean Corporation: www.americanolean.com.
 - 2. Dal-Tile Corporation: www.daltile.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Glazed Wall Tile: ANSI A137.1, standard grade.
 - 1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
 - 2. Size: 4 by 16 inch, nominal. All locations unless noted otherwise.
 - 3. Size: 2 by 8 inch, nominal. Located in Cafe/Lounge #102 as indicated on the drawings.
 - 4. Edges: Cushioned.
 - 5. Surface Finish: High gloss & Matte glaze.
 - 6. Color(s): As indicated.
 - a. Field Tile: To be selected from group one.
 - b. Accent Tile: To be selected from groups two, three and four. Three colors as indicated on the drawings.
 - 7. Pattern: As indicated on the drawings.
 - 8. Products:
 - a. American Olean Corporation; Color Story Wall: www.americanolean.com.
- C. Porcelain Tile: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 12 by 24 inch, nominal.
 - 3. Thickness: 3/8 inch.
 - 4. Edges: Square.
 - 5. Surface Finish: Matte glazed.
 - 6. Color(s): To be selected by Architect from manufacturer's standard range.
 - 7. Pattern: As indicated on the drawings..
 - 8. Trim Units: Cut 12 x 24 inch tile to provide 4 x 24 inch base w/ brushed stainless steel trim on top.
 - 9. Products:
 - a. Caesar Ceramics USA; Link: caesarceramicusa.com.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Brushed stainless steel, style and dimensions to suit application, set with tile mortar or adhesive.
 - 1. Applications:
 - a. Open edges of wall and floor tile.
 - b. Outside wall corners.
 - c. Transition between floor finishes of different heights.
 - d. Thresholds at door openings.
 - e. Borders and other trim as indicated on drawings.
 - 2. Products:
 - a. Schluter-Systems: www.schluter.com.
 - b. Profilitex S.P.A.: www.profilitec.com.

2.03 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
 - 1. ARDEX Engineered Cements: www.ardexamericas.com.
 - 2. LATICRETE International, Inc: www.laticrete.com.
 - 3. Mapei Corporation: www.mapei.com.

- C. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
 - 1. Products:
 - a. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com.
 - b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com.

2.04 GROUTS

- A. Standard Grout: ANSI A118.6 standard cement grout.
 - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): As selected by Architect from manufacturer's full line.
 - 4. Products:
 - a. ARDEX Engineered Cements; ARDEX FL: www.ardexamericas.com.
 - b. LATICRETE International, Inc; LATICRETE Permacolor Grout: www.laticrete.com.

2.05 ACCESSORY MATERIALS

- A. Waterproofing 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. Fluid or Trowel Applied Type with Embedded Reinforcing Fabric:
 - a. Products:
 - 1) ARDEX Engineered Cements; ARDEX 8+9: www.ardexamericas.com.
 - 2) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 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.

3.03 INSTALLATION - GENERAL

- A. Install tile and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.20, manufacturer's instructions, and TCNA (HB) or TCNA (HB-GP) recommendations, as applicable.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.

- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- K. 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.

3.04 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.

3.05 INSTALLATION - WALL TILE

- A. 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.

3.06 CLEANING

- A. Clean tile and grout surfaces.

3.07 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

**SECTION 09 51 00
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.03 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.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
- 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.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.05 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Acoustical Panels, Type ACT-3: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - b. Pattern: Fine Texture.
 - 2. Size: 24 by 48 inches.
 - 3. Thickness: 3/4 inch.

4. Light Reflectance: 84 percent, determined in accordance with ASTM E1264.
 5. NRC: 0.70, determined in accordance with ASTM E1264.
 6. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 7. Panel Edge: Square.
 8. Color: White.
 9. Suspension System: Exposed grid.
 10. Products:
 - a. Armstrong World Industries, Inc; High Acoustics - School Zone Fine Fissured: www.armstrongceilings.com.
 - b. USG Corporation; Radar High-NRC Acoustical Panels: www.usg.com/ceilings.
- B. Acoustical Panels: Mineral fiber with membrane-faced overlay, with the following characteristics:
1. Classification: ASTM E1264 Type IV.
 - a. Form: 2, water felted.
 - b. Pattern: "E" - lightly textured.
 2. Size (Type ACT-1): 24 by 24 inches.
 3. Size (Type ACT-2): 24 by 48 inches.
 4. Thickness: 7/8 inch.
 5. Light Reflectance: 90 percent, determined in accordance with ASTM E1264.
 6. NRC: [0.80], determined in accordance with ASTM E1264.
 7. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 8. Panel Edge: Tegalur.
 9. Color: White.
 10. Suspension System: Exposed grid.
 11. Products:
 - a. Armstrong World Industries, Inc; Ultima, Model #1941: www.armstrongceilings.com.
 - b. USG Corporation; Mars Acoustical Panels, Model #87200: www.usg.com/ceilings.
- C. Wood Grille, Type WD-1: Linear wood slats on heavy duty drywall grid.
1. Size: 3/4" blade width, 3 1/4" blade depth, 2" spacing between blades.
 2. Noise Reduction Coefficient (NRC): 1.15
 3. Finish: Natural wood veneer. Species and finish to be selected from manufacturers standard range.
 4. Properties: Class A fire performance.
 5. Accessories:
 - a. Include all manufacturers standard accessories.
 - b. Include black acoustic felt between slats.
 - c. Include 2" fiberglass acoustic infill, E-400 mount per ASTM C423-17 (ceiling).
 - d. At Cafe/Lounge #102: Include 6" high wood veneer trim by same manufacturer around perimeter of ceiling cloud.
 6. Suspension system: Manufacturers recommended concealed, heavy-duty drywall suspension system, backer grille (no dowels).
 7. Products:
 - a. Certainteed, Grille Modules: www.certainteed.com.
 - b. Madrid Inc: www.madridinc.com.

2.02 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with steel cap.
 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.

2. Profile: Tee; 15/16 inch face width.
3. Finish: Baked enamel.
4. Color: White.
5. Products:
 - a. USG Corporation; Donn Brand ZXLA 15/16 inch Acoustical Suspension System: www.usg.com/ceilings.
 - b. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. 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.
 3. Shadow Molding: Shaped to create a perimeter reveal. Provide at all locations where ACT-1 abuts GWB soffit at the same elevation.
- 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.
 4. Products:
 - a. Armstrong World Industries, Inc; Axiom Vector Trim: www.armstr
 - b. USG Corporation; Compasso Suspension Trim: www.usg.com/ceilings.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete including all firestopping.
- B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. 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. Use longest practical lengths.
 2. 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. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 CLEANING

- A. Clean surfaces.
- B. Replace damaged or abraded components.

END OF SECTION

**SECTION 09 65 00
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Static control resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.02 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2019a, with Editorial Revision (2020).
- B. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring; 2006 (Reapproved 2018).
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2023.
- D. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
- E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.03 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. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 100 square feet of each type and color.
 - 3. Extra Wall Base: 50 linear feet of each type and color.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

1.06 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions

above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Static Control Tile - Type SDT: Homogeneous; color and pattern throughout thickness.
 - 1. Manufacturers:
 - a. Armstrong World Industries, Inc; SDT Static Dissipative Tile: www.armstrong.com.
 - 2. Minimum Requirements: Vinyl composition tile complying with ASTM F1066, Class 2.
 - 3. Electrical Resistance:
 - a. Dissipative Tile: Resistance between 1.0 megohms and 1000 megohms as tested in accordance with ASTM F150.
 - 4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or ASTM E 648.
 - 5. Tile Size: 12 by 12 inch.
 - 6. Total Thickness: 0.125 inch.
 - 7. Color: To be selected by Architect from manufacturer's full range.

2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TP, rubber, thermoplastic; top set Style B, Cove.
 - 1. Manufacturers:
 - a. Roppe Corporation: www.roppe.com.
 - 2. Height: 4 inches.
 - 3. Thickness: 0.125 inch.
 - 4. Finish: Satin.
 - 5. Length: 4 foot sections.
 - 6. Color: To be selected by Architect from manufacturer's full range.

2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer and suitable for substrate conditions and compatible with flooring.
- C. Copper Grounding Strips: Type and size as recommended by static control flooring manufacturer.
- D. Floor Polish for Static Control Flooring: Fluid-applied polish, intended to protect electrical properties of flooring, as recommended by static control flooring manufacturer.
- E. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test 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.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare subfloor and wall substrates as recommended by flooring, base and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of substrate 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. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 26 05 26 for grounding and bonding to building grounding system.
 - 3. Fit joints and butt seams tightly.
 - 4. 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.

3.04 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.

3.05 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, 'V' cut back of base strip to 2/3 of its thickness and fold. 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.

3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.
 - 1. Provide 2 coats of sealer and 3 coats of polish.

3.07 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

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SECTION 09 68 13 TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet tile, loose layed with corner connectors.

1.02 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2019a, with Editorial Revision (2020).
- C. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.03 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 and color pattern.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- 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 Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.05 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Tile Carpeting, Type CARP-1: Tufted, manufactured in one color dye lot.
 - 1. Product: Sound of Color, D/LUX manufactured by Miliken.
 - 2. Plank Size: 25 cm by 1 m (9.85" by 39.4"), nominal.
 - 3. Color: To be selected by Architect from Manufacturer's full line..
 - a. One field color and two accents to be selected.
 - 4. Pattern: Vertical ashlar.
 - 5. Critical Radiant Flux: Minimum of 0.45 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 - 6. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 - 7. VOC Content: Provide CRI (GLP) certified product.
 - 8. Maximum Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
 - 9. Yarn Type: Milliken ertified WearOn Nylon.

10. Finished Pile Thickness: 0.112 inches.
11. Primary Backing Material: TractionBack Plus.
- B. Tile Carpeting, Type CARP-2: Tufted, manufactured in one color dye lot.
 1. Product: Stereovision, Light Wave manufactured by Miliken.
 2. Plank Size: 25 cm by 1 m (9.85" by 39.4"), nominal.
 3. Color: To be selected by Architect from Manufacturer's full line.
 - a. One field color to be selected.
 4. Pattern: Vertical ashlar.
 5. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 6. VOC Content: Provide CRI (GLP) certified product.
 7. Maximum Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
 8. Face Yarn: Universal Fibers, Solution-Dyed Nylon.
 9. Finished Pile Thickness: 0.087 inches.
 10. Primary Backing Material: TractionBack Plus.
- C. Tile Carpeting, Type CARP-3: Tufted, manufactured in one color dye lot.
 1. Product: OBEX Tile - CUTX / Stipple manufactured by Miliken.
 2. Tile Size: 50 cm by 50 cm (19.7" by 19.7"), nominal.
 3. Color: To be selected by Architect from Manufacturer's full line.
 4. Pattern: Mololithic.
 5. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 6. VOC Content: Provide CRI (GLP) certified product.
 7. Maximum Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
 8. Face Yarn: Milliken-Certified WearOn Nylon and Monofilament.
 9. Dye Method: PrintWorks Precision Dyeing.
 10. Gage: 5/32 inch.
 11. Stitches: 9.5 per inch.
 12. Primary Backing Material: TractionBack Plus.

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Rubber, color as selected by Architect.
- C. Tile Connectors: TractionBack Plus connectors for use with releasable carpet tile. Designed to go over floors with unlimited pH and relative humidity levels.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

3.02 PREPARATION

- A. Contractor shall include all flash patching and preparation of floor surfaces required below new flooring as necessary to provide 100 percent guarantees.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

- E. Lay carpet tile in vertical ashlar pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Trim carpet tile neatly at walls and around interruptions.
- G. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

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SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. 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 that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Ceramic and other tiles.
 - 8. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
 - 9. Glass.
 - 10. Acoustical materials, unless specifically indicated.
 - 11. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.
- B. "Exposed" as used in this section shall mean all surfaces that will be exposed to view after project is completed.
- C. "Concealed" as used in this section shall mean all surfaces that will not be exposed to view after project is completed.

1.03 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; 2023.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- F. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 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.
- C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- E. 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.
- 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 Paint and Finish Materials: 1 gal of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.05 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 five years experience and approved by manufacturer.

1.06 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.

1.07 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

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Benjamin Moore & Co: www.benjaminmoore.com.
 - 2. PPG Paints: www.ppgpaints.com.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com.
- C. Primer Sealers: Same manufacturer as top coats.

2.02 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. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of New York State.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.
 - 2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
 - 3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 - 4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.03 PAINT SYSTEMS - INTERIOR

- A. Gypsum Board or Plaster Walls:
 - 1. Eg-Shel Latex Finish: two coats over primer, Low Odor, Zero-VOC System.
 - a. Primer: S-W ProMar 200 Zero VOC Interior Latex Primer (B28W2600).
 - b. First Coat: S-W ProMar 200 Zero-VOC Latex Eg-Shel Finish (B20-2600).
 - c. Second Coat: S-W ProMar 200 Zero-VOC Latex Eg-Shel Finish (B20-2600).

- B. Gypsum Board Ceiling:
 - 1. Lusterless (Flat) Latex Finish: two coats over primer, Low Odor, Zero-VOC System.
 - a. Primer: S-W ProMar 200 Zero VOC Interior Latex Primer (B28W2600).
 - b. First Coat: S-W ProMar 200 Zero-VOC Latex Flat Finish (B30-2600).
 - c. Second Coat: S-W ProMar 200 Zero-VOC Latex Flat Finish (B30-2600).
- C. Exposed Structural Ceilings; Ferrous and Galvanized Metal:
 - 1. Waterborne Acrylic Coating, Flat Finish with flash rust resistance, low odor and Low-VOC content.
 - a. Primer: S-W Pro Industrial Pro-Cryl Universal Primer (B66-310) on Ferrous Steel if not factory primed.
 - b. First Coat: S-W Low-VOC Waterborne Acrylic Dryfall (B42 Series).
 - c. Second Coat: S-W Low-VOC Waterborne Acrylic Dryfall (B42 Series).
- D. Stained Woodwork:
 - 1. Stained - Varnished Finish: finish coats over stain plus filler coat on open - grain wood. Wipe filler before applying first varnish coat.
 - a. Filler Coat: Minwax Stainable Wood Filler.
 - b. Stain Coat: Minwax 250 Wood Stain (7107/7108 Series).
 - 1) Color to match existing and as selected by Architect.
 - c. First Coat: Minwax High Build Polyurethane, Satin Finish (7109 Series).
 - d. Second Coat: Minwax High Build Polyurethane, Satin Finish (7109 Series).
- E. Painted Woodwork and Hardboard:
 - 1. Semi-Gloss Latex Finish: two coats over primer with low odor, Zero-VOC System.
 - a. Primer: S-W ProMar 200 Zero VOC Interior Latex Primer (B28W2600).
 - b. First Coat: S-W ProMar 200 Zero-VOC Latex Semi-Gloss Finish (B31-2600).
 - c. Second Coat: S-W ProMar 200 Zero-VOC Latex Semi-Gloss Finish (B31-2600).
- F. Ferrous Metal:
 - 1. Semi-Gloss Latex Finish: two coats over primer with low odor and Zero-VOC Topcoat.
 - a. Primer: S-W Pro Industrial Pro-Cryl Universal Primer (B66-310).
 - b. First Coat: S-W Pro Industrial Acrylic Semi-Gloss Finish (B66-650).
 - c. Second Coat: S-W Pro Industrial Acrylic Semi-Gloss Finish (B66-650).
- G. Zinc-Coated Metal:
 - 1. Semi-Gloss Latex Finish: two coats over primer with low odor and Zero-VOC Topcoat.
 - a. Primer: S-W Pro Industrial Pro-Cryl Universal Primer (B66-310).
 - b. First Coat: S-W Pro Industrial Acrylic Semi-Gloss Finish (B66-650).
 - c. Second Coat: S-W Pro Industrial Acrylic Semi-Gloss Finish (B66-650).

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been 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. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- I. 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.
- J. 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.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and as required. Protect from corrosion until coated.
- K. 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.
- L. No painting or finishing shall be started until the surface to be painted or finished is in proper condition in every respect. Surfaces that cannot be properly prepared by the painter for finishing shall not be painted or finished until they are rectified, unless instructed otherwise by the Architect. Application of painting materials shall be acceptance by the Contractor of the surface as suitable for painting.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

**SECTION 10 11 00
VISUAL DISPLAY UNITS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass markerboards.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on porcelain enamel steel markerboard, glass markerboard, tackboard, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- D. Samples: Color charts for selection of color and texture of tackboard.
- E. Manufacturer's printed installation instructions.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 VISUAL DISPLAY UNITS

- A. Magnetic Glass Markerboards:
 - 1. Manufacturers:
 - a. Claridge Products and Equipment, Inc: www.claridgeproducts.com.
 - b. MooreCo, Inc: www.moorecoinc.com.
 - 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. Glass Finish: White back-coating.
 - 4. Steel Backing Sheet Thickness: 24 gauge, 0.0239 inch .
 - 5. Height: 48 inches.
 - 6. Length: As indicated on drawings.
 - 7. Frame: No frame, with concealed fasteners.
 - 8. Mounting: Concealed Z clips.
 - 9. Accessories: Provide magnetic marker holder, magnetic eraser, and magnets.
 - 10. Products:
 - a. Glass Marker Wall by Claridge.
 - b. Approved equivalent.

2.02 MATERIALS

- A. 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 II impact test requirements.

2.03 ACCESSORIES

- A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- B. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Install with bottom of perimeter frame at 36 inches above finished floor.
- C. Secure units level and plumb.

3.03 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

1.01 SECTION INCLUDES

- A. Panel signage.

1.02 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 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. Elevations of every sign in the project will be required, and will be reviewed by the Owner prior to shop drawing approval.
- D. Manufacturer's qualification statement.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 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 tape adhesive at normal room temperature.

1.06 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

2.01 MANUFACTURERS

- A. Panel Signage:
 - 1. Best Sign Systems, Inc: www.bestsigns.com.
 - 2. Mohawk Sign Systems, Inc: www.mohawksign.com.
 - 3. Approved equivalent.

2.02 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.

2.03 PANEL SIGNAGE

- A. Panel Signage:
 - 1. Application: Room and door signs.
 - 2. Description: Flat signs with engraved panel media, tactile characters.
 - 3. Sign Size: 6 inches by 8 inches.
 - 4. Total Thickness: 1/8 inch.

5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.
8. 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: Black.
 - d. Character Color: White color.
9. Material: Laminated colored plastic engraved through face to expose core as background color.
10. Material: One-piece injection molded acrylic plastic with raised letters and braille.
11. Tactile Letters: Raised 1/32 inch minimum.
12. Braille: Grade II, Unified English Braille (UEB), ADA-compliant.
13. One-Sided Wall Mounting: Tape adhesive.

2.04 SIGNAGE APPLICATIONS

- A. Room and Door Signs:
 1. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", universal handicap accessible symbol and braille.

2.05 ACCESSORIES

- A. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 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.

3.02 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 mm-dd-yyyy; repair or replace damaged items.

3.03 SCHEDULE

- A. Toilet Rooms:
 1. WOMEN 124: Woman pictogram, universal handicap accessible symbol, WOMEN text and braille.
 2. MEN 125: Man pictogram, universal handicap accessible symbol, MEN text and braille.
 3. MEN 23: Man pictogram, universal handicap accessible symbol, MEN text and braille.
 4. TOILET 20: Man pictogram, woman pictogram, universal handicap accessible symbol, UNISEX text and braille.

END OF SECTION

SECTION 10 21 13.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid plastic toilet compartments.
- B. Urinal screens.

1.02 REFERENCE STANDARDS

- A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Solid Plastic Toilet Compartments:
 - 1. Ampco Products, Inc; Solid Plastic: www.ampco.com.
 - 2. ASI Global Partitions; Solid Plastic: www.asi-globalpartitions.com.
 - 3. Metpar Corp; Solid Plastic HDPE: www.metpar.com.
 - 4. Scranton Products (Santana/Comtec/Capital); Hiny Hiders: www.scrantonproducts.com.

2.02 PLASTIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286, floor-mounted headrail-braced.
 - 1. Color: Two colors as selected.
- B. Doors:
 - 1. Thickness: 1 inch.
 - 2. Width: 24 inch.
 - 3. Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: 55 inch.
- C. Panels:
 - 1. Thickness: 1 inch.
 - 2. Height: 55 inch.
 - 3. Depth: As indicated on drawings.
- D. Pilasters:
 - 1. Thickness: 1 inch.
 - 2. Width: As required to fit space; minimum 3 inch.
- E. Screens: Without doors; to match compartments; mounted to wall with two panel brackets and 2 inch square stainless steel post, floor mounted with cap to align with top of panel, as shown on the drawings.

2.03 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.

1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Extruded aluminum, anti-grip profile.
 1. Size: Manufacturer's standard size.
- C. Wall Brackets: Stainless steel; continuous type.
- D. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
 1. For attaching panels and pilasters to brackets: Through-bolts and nuts .
- E. Hinges: Stainless steel, manufacturer's standard finish.
 1. Continuous-type hinge, self closing.
- F. Door Hardware: Stainless steel, manufacturer's standard finish.
 1. Door Latch: Slide type with exterior emergency access feature.
 2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
 3. Provide door pull for outswinging doors.
- G. Coat Hook: One per compartment, mounted on door.
- H. Privacy Strip: Stainless steel privacy strip on latch side of door, manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Diaper changing stations.
- C. Utility room accessories.

1.02 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; 2022.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.
- G. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.04 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. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Commercial Toilet, Shower, and Bath Accessories:
 - 1. ASI - American Specialties, Inc: www.americanspecialties.com.
 - 2. Bobrick Washroom Equipment: www.bobrick.com.
 - 3. Bradley Corporation: www.bradleycorp.com.

2.02 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 2 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: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- 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.

2.03 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.
- C. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Furnished by Owner, installed by General Contractor.
- B. Paper Towel Dispenser: Furnished by Owner, installed by General Contractor.
- C. Soap Dispenser: Furnished by Owner, installed by General Contractor.
- D. Mirror (Type M3): Frameless, LED Lighted, Surface Mounted.
 - 1. Annealed Float Glass: 5/32 inch thick.
 - 2. Size: 60 inches by 36 inches, mounted horizontally.
 - 3. Power: 120 V.
 - 4. Mounting: Surface mounted with concealed aluminum mounting system.
 - 5. Basis of Design:
 - a. American Specialties, Inc.; Model 0640-6036: www.americanspecialties.com.
- E. Mirrors (Types M1 and M2): Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
 - 1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
 - 2. Size: As indicated on drawings.
 - 3. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 - 5. Products:
 - a. American Specialties, Inc; 0600 Series: www.americanspecialties.com.
- F. Grab Bars: Stainless steel, peened surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, concealed 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.
 - e. Basis of Design:
 - 1) American Specialties, Inc; 3800 Series: www.americanspecialties.com.

- G. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
 - 1. Basis of Design:
 - a. American Specialties, Inc; Roval model 20852: www.americanspecialties.com.

2.05 DIAPER CHANGING STATIONS

- A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
 - 1. Material: Polyethylene.
 - 2. Mounting: Surface.
 - 3. Color: Gray.
 - 4. Minimum Rated Load: 50 pounds.
 - 5. Basis of Design:
 - a. American Specialties, Inc., Model 9012: www.americanspecialties.com.

2.06 UTILITY ROOM ACCESSORIES

- A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
 - 1. Holders: Three spring-loaded rubber cam holders.
 - 2. Length: 26 inches.
 - 3. Basis of Design:
 - a. American Specialties, Inc; Model 0796-3: www.americanspecialties.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.
- E. See Section 06 10 00 for installation of blocking, reinforcing plates, and concealed anchors in walls.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install plumb and level, securely and rigidly anchored to substrate.
- B. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
 - 1. Grab Bars: As indicated on drawings.
 - 2. Mirrors over sinks: 40 inch, measured from floor to bottom of mirrored surface.
 - 3. Other Accessories: As indicated on drawings.

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

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**SECTION 10 44 00
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.02 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; Current Edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and installation instructions.
- C. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, installation procedures, and accessories required for complete installation.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.04 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Larsen's Manufacturing Co.: www.larsensmfg.com.
 - 2. Kidde, a unit of United Technologies Corp: www.kidde.com.
 - 3. Nystrom, Inc: www.nystrom.com.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 5 pound.
 - 3. Finish: Baked polyester powder coat, red color.
 - 4. Temperature range: Minus 40 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS

- A. Cabinet Construction: Non-fire rated.
- B. Cabinet Configuration: Semi-recessed type.
 - 1. Size to accommodate accessories.
 - 2. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

- C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with roller type catch. Hinge doors for 180 degree opening with continuous piano hinge.
- D. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
- 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: Anodized to Dark Bronze color.
- H. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Graphic Identification: Two sided sign, wall mounted, above extinguisher / cabinet.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, 16 inches from finished floor to inside bottom of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets and on wall brackets.

3.03 SCHEDULES

- A. First floor: Larsen's semi-recessed cabinet AL-2409-5R, full panel door glazing, Larsen's extinguisher MP5.
 - 1. Quantity: Three.
- B. Basement: Larsen's extinguisher MP5 on wall bracket.
 - 1. Quantity: One.

END OF SECTION

**SECTION 12 24 00
WINDOW SHADES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior manual roller shades.

1.02 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.
- C. WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. 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.

1.04 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. Selection Samples: Include fabric samples in full range of available colors and patterns.
- E. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- F. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- G. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.05 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. Factory training and demonstrated experience.

1.06 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.

1.07 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 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

2.01 MANUFACTURERS

- A. Interior Manually Operated Roller Shades:
 - 1. Draper, Inc; Clutch Operated FlexShade: www.draperinc.com.
 - 2. Hunter Douglas Architectural; RB500 Manual Roller Shades: www.hunterdouglasarchitectural.com.
 - 3. MechoShade Systems LLC; Mecho/5 System: www.mechoshade.com.

2.02 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. Roller Shades:
 - 1. Description - Interior Roller Shades: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Mounting: Window jamb mounted - outside, on face of jambs.
 - c. Size: As required to extend the entire width of each opening.
 - d. Fabric: As indicated under Shade Fabric article.
 - 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Stamped steel.
 - 3. Roller Tubes: As required for type of shade operation.
 - a. Material: Extruded aluminum, clear anodized finish.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.
 - 4. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
 - 5. Manual Operation for Interior Shades:
 - a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
 - b. Drive Chain: Continuous loop beaded ball chain, 95 lb minimum breaking strength. Provide upper and lower limit stops.
 - c. Chain Retainer:
 - 1) Chain tensioning device complying with WCMA A100.1.
 - 2) Manufacturer's standard clip.
 - 6. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.
 - 1) Color: As selected by Architect from manufacturers full range.
 - 2) Profile: Square.
 - b. End Caps: Provide manufacturer's standard end caps to cover exposed ends of brackets.

2.03 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; GreenScreen Revive - 1%: www.mermetusa.com.
 - b. Approved equivalent.
 - 2. Material: 100 percent polyester.
 - 3. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
 - 4. Color: As selected by Architect from manufacturer's full range of colors.

2.04 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 sill.
 - 2. Horizontal Dimensions - Outside Mounting: Cover window frames, trim, and casings completely.
- C. Dimensional Tolerances: As recommended in writing by manufacturer.
- D. 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

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 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.

3.03 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.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.05 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.

3.06 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

3.07 SCHEDULE

- A. Provide window shades at Window Type A and all curtain wall locations as noted on drawing A603 .

END OF SECTION

SECTION 12 32 16
MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pre-manufactured casework.

1.02 SUMMARY

- A. Casework designated on the drawings by catalog model number is based on Stevens Industries Inc, www.stevensind.com, unless noted otherwise.

1.03 REFERENCE STANDARDS

- A. NEMA LD-3 - Standard for High Pressure Decorative Laminate; 2005.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Drawings shall consist of floor plans indicating arrangement and relation to adjacent work and equipment, and complete elevations of casework. Centerline of service requirements shall be noted for use by other Trades.
- C. Manufacturer's Qualification Statement.
- D. Manufacturers Data: Submit catalog cuts and details for evaluation and coordination.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Installer's Qualification Statement.
- G. Full sized sample: Upon request of Architect, provide one full sized cabinet sample showing cabinet construction, drawer and door constructions and all hardware. Sample will be returned to manufacturer.

1.05 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 work of this section with minimum five years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver casework only after wet operations in building are completed.
- B. Store casework in a ventilated place, protected from the weather, with relative humidity therein of 50 percent or less at 70 degrees F.
- C. Protect surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.
- D. Damaged material shall be replaced without any additional cost to the Owner.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a three year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Stevens Industries Inc; 1200 Tradition Series: www.stevensind.com.
- B. Other acceptable manufacturers:
 - 1. Case Systems: www.casesystems.com.

2.02 CONSTRUCTION

A. Core Material

1. Medium density particleboard shall be minimum 45 pound density industrial grade of 3 ply balanced construction meeting or exceeding requirements of ANSI/NPA A208.1-2009 standard, Grade M2. Moisture content shall not exceed 8 percent.
2. Medium density fiberboard shall have a minimum 48 pound density and shall meet or exceed property requirements established by ANSI/NPA A208.2-2009 standard.

B. Surface Materials

1. All surfaces which will be exposed to view when the doors and drawers are closed, including bottoms of wall units installed above 48 inches above finished floor, shall be laminated.
2. Vertical Surfaces: Surfaces shall be high-pressure laminate meeting NEMA LD3-2005 PF-28 (0.028 inch) specification standards, and be of balanced construction.
3. Horizontal Surfaces: Surfaces shall be high-pressure laminate meeting NEMA LD3-2005 PF-45 (0.042 inch) specification standards, and be of balanced construction.
4. Closed Interior; all surfaces which will be concealed from view when the doors and drawers are closed shall be laminated with thermally fused melamine conforming to NEMA LD3-2005 GP-28 (0.028 inch) specification standards.
5. Colors:
 - a. Cabinet Face shall be selected from the standard color offering of the manufacturer.
 - b. Closed Interior shall be laminated with white color laminate.

C. Edgings

1. Exposed exterior cabinet front edges shall be banded with a contrasting or matching rigid PVC extrusion, 3mm in thickness, resistant to chip, crack and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. The 3mm thick edging shall be applied with waterproof hot melt adhesive.
 - a. Color: Color shall be selected from standard offering of the manufacturer.
2. Door and drawer front edges shall be banded with a contrasting or matching rigid PVC extrusion, 3mm in thickness, resistant to chip, crack and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. The 3mm thick edging shall be applied with waterproof hot melt adhesive.
 - a. Color: Color shall be selected from standard offering of the manufacturer.
3. Adjustable shelves and interior panel components shall be edged with a high impact, flat edge PVC extrusion, .020 inch in thickness. Edging shall have satin finish with a UV cured top coat for additional durability and be applied with waterproof hot melt adhesive.
 - a. Apply PVC edging to front edge of adjustable shelves.
 - b. Color: Color shall be selected from standard offering of the manufacturer.

D. Hardware

1. Hinges shall be heavy duty 5 knuckle type with hospital tip and fixed pin and permit 270 degree door swing. Doors less than 36" in height shall have two (2) hinges per door, doors 36" to 63" in height shall have three (3) hinges per door, and all doors over 63" in height shall have four (4) hinges per door.
 - a. Color: Color shall be selected from standard offering of the manufacturer.
2. Pulls shall be 8mm diameter wire formed with powder coated or plated finish, bentwire style.
 - a. Color: Color shall be selected from standard offering of the manufacturer.
3. Door catches shall be magnetic type. Each door shall have a single catch mounted at the bottom edge. All doors over 48" high shall have a catch at both the top and bottom of the door.
4. Chain pulls shall be provided at all lockable tall cabinets.
5. Hanger rods shall be heavy duty plated tubing. Rod shall be securely affixed to cabinet shelves or cabinet sides.

6. Drawers and slide out shelves shall be suspended on bottom mount epoxy coated steel slides to insure quiet, smooth operation. Slides shall have 150 lb. load rating with built in drawer stop and self close feature in the last 3" of travel, and includes a closed side to side alignment. Secure with 1 1/2 inch long screws into cabinet construction. File drawers shall include extruded top mounted molded side rails to accept standard hanging file folders.
- E. Shelving
1. Adjustable Shelf Support System.
 - a. Support clips for adjustable shelves 3/4 inch and 1 inch thick shall be injection molded nylon shelf clips. Support clips shall incorporate integrally molded lock tabs to retain shelf from tipping or inadvertently being lifted out. Support clip shall have double (2) pin engagement into precision bored hole pattern in cabinet vertical members. Clips shall have a molded ridge in the clip body which will provide additional pressure against edge of shelving and maintain positive pin engagement. Clip shall be designed in such a manner to provide means to permanently attach shelf to support clips. Static test load must exceed 200 pounds per clip.
 - b. Dividers 1/4 inch thick shall be fully adjustable and retained with injection molded nylon support clip. Clip shall trap divider to eliminate lift out.
 - c. All adjustable shelves and dividers shall be adjustable on 32 mm (1-1/4 inch) center through full height of compartment.
- F. Component Details
1. Drawers shall be full box design with a separate front. Drawer sides and ends must be constructed of 5/8 inch medium density fiberboard with white laminate faces and matching white PVC top edges. Bottoms shall be 1/4 inch medium density fiberboard with almond color facing.
 2. Corner Joints: Shall be interlocking dowel pin design. Hardwood dowel pins, 8 mm. diameter, shall be inserted into drawer ends and fitted into matching hole patterns in drawer sides. Bottoms must be trapped in grooves on all four sides. All joints shall be glued and bottoms shall have additional mechanical fasteners. Drawers shall be suspended on slides as described within.
 3. Solid hinged doors shall be 3/4 inch thick material of balanced construction, surfaced as described in Paragraph 2.02.B. Doors 48 inches and less shall have two (2) hinges per door. Doors exceeding 48 inches in height must have three (3) hinges per door. All door edges shall be finished with a high impact vinyl plastic extrusion matched to trim group color selection.
 4. Adjustable shelves less than 36 inches in length shall be 3/4 inch thick. Shelves 36 inches long and over, and all adjustable shelves in wall cabinets and bookcases, shall be 1 inch thick. All adjustable shelves shall be constructed of 45 pound density particleboard with white melamine laminate surfaces. Leading edge of shelf shall be finished with a high impact, rigid PVC extrusion to match shelf surface and cabinet interior.
 5. Frame rails between drawers must be full length, 3/4 inch thick by 3-1/2 inches wide, pinned and fastened into cabinet sides. The front leading edge shall have PVC self-edge to match the trim group color.
- G. Fixed Casework Base, Wall, and Tall Units
1. Corner joints incorporating dowel pin construction must be factory glued and clamped under pressure to assure rigid load-bearing corner joints.
 2. Cabinet ends shall be 3/4 inch thick panels of balanced construction, precision bored for dowel pins installed in horizontal cabinet members. Base and tall units shall have one piece end panels continuous to floor for added load capability. Unexposed ends shall have laminate backing sheet.
 3. Cabinet bottoms and tops shall be 3/4 inch thick panels of balanced construction for base and tall units. Panels are to be precision bored to receive fluted dowel pins, which must be inserted with glue. These dowel pins shall extend from the panel ends for joining into mating hole patterns in the cabinets' side panels.

4. Wall cabinets shall have full one inch thick panels of balanced construction. These panels must feature the same fluted dowel pin and glue joint construction as the base and tall cabinets.
5. Sub-Base: Two (2) toekick support rails constructed of 3/4 inch thick by 3 3/4 inch high particleboard and inset from cabinet front and back edges to give additional load support. Rails shall be mechanically fastened to the cabinet bottom and ends, becoming an integral part of the cabinet structure.
6. Back panels shall be 3/8 inch thick and set in from rear edge in cabinet side grooves. Wall cabinet backs shall also set in top and bottom shelf grooves. The interior surface shall be white in color.
7. Finished exposed backs of fixed cabinets are to be 3/4 inch thick panels of balanced construction, surfaced as described.
8. Hang rails shall be provided in wall cabinets in the upper back corner for mounting units to walls.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspection areas to receive materials and verify measurements. Notify Architect in writing of any discrepancies.

3.02 INSTALLATION

- A. Provide as indicated according to manufacturer's instructions and approved shop drawings.
 1. Furnish, deliver, and install plastic laminate-faced casework as shown on drawings.
 2. Provide cabinet cutouts in the field as indicated.
 3. Furnish and install fillers, scribes, finished ends, finished backs, countertops, backsplashes, sidesplashes required to provide a complete and finished project.
- B. Install cabinetry straight, level, and plumb. Scribe and closely fit to adjacent work, provide filler strips where necessary.
- C. Countertops shall be continuous.

3.03 ADJUSTING

- A. Adjust cabinetry for smooth operation.
- B. Repair damage to the satisfaction of the Architect.

3.04 CLEANING

- A. Clean and remove debris from job site.

3.05 PROTECTION

- A. Protect installed work from subsequent construction operations.

END OF SECTION

SECTION 22 56 01
GENERAL PROVISIONS

PART 1 – GENERAL

1.01 RELATED PORTIONS OF THE SPECIFICATION

- A. Work in this section shall be subject to the applicable portions of the bidding documents.

1.02 SCOPE OF WORK

- A. Furnish and install equipment and materials required to provide a complete plumbing system.

1.03 MANUFACTURER’S SAFETY DATA SHEETS (MSDS)

- A. Provide a bound, indexed assembly of pertinent equipment and materials (including applicable Subcontractor items).

1.04 CONNECTIONS TO EQUIPMENT THAT IS EXISTING AND/OR FURNISHED BY OTHERS

- A. Furnish and install branch piping serving equipment that is existing and/or furnished by others in accordance with the sizes and locations shown on the drawings, complete with final connections, including provisions for shut-off and adapters as required.

1.05 CONNECTIONS TO UTILITIES

- A. Furnish and install piping connecting with public and/or site utilities (water supply, sanitary drainage, storm drainage, natural gas, propane, or liquefied petroleum gas, medical gas) in accordance with the sizes and locations shown on the drawings, IN STRICT COMPLIANCE WITH THE RULES AND REGULATIONS SET FORTH BY THE LOCAL AUTHORITY HAVING JURISDICTION, complete with tests and final connections, with provisions for shut-off and adaptors as required.
- B. Connections causing interruption of service shall be performed “off-hours” employing “premium time” labor rates as applicable.
- C. The Owner will pay all related public utility charges.

1.06 FABRICATION DRAWINGS, MATERIAL LISTS AND EQUIPMENT SUBMITTALS

- A. Prior to installation, submit fabrication drawings, material lists and equipment submittals (shop drawings) for approval in accordance with the following:

1. It is the intent of these specifications to define the requirement for fabrication drawings, material lists and equipment submittals. Questions regarding these requirements shall be directed to the Engineer prior to submission.
2. Fabrication drawings and material lists shall conform with the requirements herein specified.
3. Equipment submittals, unless otherwise specified, shall conform with the following:
 - a. Submittals shall be complete with the manufacturer's product description literature. SUBMITTALS WITH INSUFFICIENT LITERATURE WILL BE DISAPPROVED.
 - b. Submittals shall include a complete listing of associated parameters contained in the bidding documents (materials, finishes, capacities, temperatures, pressures, electrical characteristics, etc.). THE ENGINEER WILL NOT TRANSFER INFORMATION FROM THE BIDDING DOCUMENTS TO THE SUBMITTALS. INCOMPLETE SUBMITTALS WILL BE DISAPPROVED.
 - c. Submittals shall be clearly marked to differentiate between the applicable and extraneous portions. THE ENGINEER WILL NOT MARK THE SUBMITTALS. UNMARKED SUBMITTALS WILL BE DISAPPROVED.
 - d. The attached Submittal Cover Sheet shall be copied, filled out and attached to each item submitted.
4. SUBMITTALS (INCLUDING RE-SUBMISSIONS), PREPARED AND TRANSMITTED IN ELECTRONIC FORMAT, SHALL BE ACCOMPANIED WITH A HARD COPY COMPRISED OF ORIGINAL, PRINTED PRODUCT LITERATURE (PHOTOCOPIES ARE NOT ACCEPTABLE).
5. ADDITIONALLY, ELECTRONIC SUBMITTALS WHICH DO NOT CONFORM WITH THE ABOVE REQUIREMENTS WILL NOT BE REVIEWED, BUT RATHER DELETED WITH A CORRESPONDING TRANSMISSION: "REJECTED, NON-COMPLIANT SUBMISSION!"
6. Unless otherwise noted or herein specified, the following are required:
 - a. Material lists:
 - 1) Piping systems.
 - 2) Piping hangers and supports.
 - 3) Insulation systems.
 - 4) Fire stopping.
 - b. Fabrication drawings:

- 1) Piping systems.
- c. Equipment submittals:
 - 1) Flashing.
 - 2) Cleanouts.
 - 3) Shock Absorbers
 - 4) Fixtures
 - 5) Floor Drains
 - 6) Roof Drains
 - 7) Wall Hydrants (Box Type)
 - 8) Roof Hydrants
 - 9) Sump Pumps
 - 10) Electric Water Coolers
 - 11) Insulation
 - 12) Identification

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Materials and equipment shall be in strict accordance with the parameters herein specified.

2.02 ACCESSORIES AND COMPONENTS

- A. It is the intent of this specification that systems and equipment shall be complete with the necessary quantity of all accessories and components required to insure a properly functioning installation.

2.04 MOTORS AND MOTOR STARTERS

- A. Units serving driven equipment herein specified shall conform with the parameters set forth in Sections 22 58 94 and 22 58 95, respectively.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Work shall be expeditiously executed in a well-planned, organized, neat, workmanship like manner.
- B. Unless otherwise noted or herein specified, all materials and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. System components shall be installed in a fashion ensuring easy serviceability.
- D. Electrical work herein specified and/or noted shall be executed in strict conformance with the National Electrical Code (NEC).
- E. Work shall be executed by tradesmen licensed as required by the authority having jurisdiction.

3.02 REMOVALS

- A. Unless otherwise noted or herein specified, equipment and materials shown and/or specified to be removed (including related accessories and appurtenances) shall become the Contractor's property and shall not be permitted to accumulate but shall be promptly removed from the job site.
- B. The removal and disposal of glycol solutions, petroleum products, refrigerants and components containing asbestos and/or polychlorinate biphenyls (PCB's) shall be in strict conformance with governing federal, state and local regulations.
- C. Work shall be carefully executed to prevent the disruption of or damage to new work or existing work that is to remain.

3.03 CEILING PLENUM SPACE COORDINATION

- A. Unless otherwise shown and/or noted, mechanical/electrical distribution systems shall generally be arranged in the following descending order:
 - 1. Branch sprinkler piping and feeder conduits (highest).
 - 2. Ductwork.
 - 3. HVAC hydronic piping and plumbing piping (lowest).
- B. Gravity drainage piping systems (steam, steam condensate, sanitary, storm, etc.) shall be accommodated in context with their necessary precedence.
- C. Branch circuit conduits shall be accommodating as required.

3.04 PROTECTION

- A. Materials, equipment and accessories shall be suitably covered and protected during construction.
- B. Materials, equipment and accessories damaged during construction shall be replaced at no cost to the Owner.

3.05 SUPPORTS

- A. Provide auxiliary steel (beams, channels, angles, formed shapes, etc.) required to properly support equipment and distribution systems.
- B. Utilize galvanized components (wherever practical) or field apply two coats of corrosion resistant primer.
- C. Seismic anchorages, restraints and equipment supports shall comply with National Uniform Seismic Installation Guidelines.

3.06 FINAL CLEANING, EQUIPMENT ROOMS

- A. Remove trash and debris.
- B. Thoroughly sweep (using sweeping compound) and subsequently vacuum floors.
- C. Hand wash wall surfaces and equipment and remove any foreign substance (adhesive, extraneous paint, droppings, etc.).
- D. Damp-mop floors.

3.07 RECORD DRAWINGS

- A. Promptly record (in a neat, legible and red-color-only accentuated fashion, on a complete, designated set of bidding documents containing no other markings) significant differences reflected by the actual installation (sizes, capacities, locations and features of distribution systems and equipment).

3.08 OPERATION AND MAINTENANCE MANUAL

- A. Upon completing the material lists and equipment submittal process, submit two bound, neatly arranged, indexed Operation and Maintenance Manuals for approval.
- B. Manuals shall be contained in heavy duty, 3-ring vinyl covered loose-leaf binders (suitable sets of MANAGEABLE SIZE, like equipment and systems grouped) complete with:
 - 1. Typewritten description of contents within a clear plastic sleeve on the spine.
 - 2. Dividers with labeled, celluloid covered tabs.
 - 3. Protective plastic jacket enclosures for diagnostic software.
- C. Manuals shall contain:
 - 1. Title page delineating:
 - a. Name of project.
 - b. General nature of contents.

- c. Name and address of Contractor and Engineer.
 - d. Applicable cross-references to related volumes.
- 2. Table of contents listing equipment (including the associated alphanumerical designation) and the corresponding section (tab).
- 3. Pertinent equipment information, including:
 - a. Manufacturer and serial number.
 - b. Approved submittal.
 - c. Operating and maintenance instructions.
 - d. Names, addresses and telephone numbers relative to parts and service.
- 4. Field checking start-up reports.
- 5. Closeout documentation:
 - a. Waiver of liens.
 - b. Electrical inspection certificate.
 - c. Pertinent equipment warranties.
 - d. Fire alarm system test report and device addresses.
 - e. Record drawings.

3.09 FIELD CHECKING START-UP

- A. Provide field checking start-up for systems and equipment in accordance with the requirements herein specified.

3.10 INSTRUCTION

- A. Provide thorough, organized instruction regarding equipment and systems operation to the Owner's authorized representatives (secure written acknowledgement and forward to the Engineer); refer to respective specification sections for designated requirements.

END OF SECTION

ATTACHMENT: Submittal Cover Sheet

SUBMITTAL COVER SHEET

CONTRACTOR: _____

ADDRESS: _____

TELEPHONE: _____

DATE: _____

NOTE: ATTACH A COMPLETED COVER SHEET TO EACH COPY

PROJECT: CORNELL COOPERATIVE EXTENSION
MARCH PROJECT #23036

TYPE OF SUBMITTAL (CHECK):

☐ FABRICATION DRAWING

☐ MATERIAL LIST

☐ EQUIPMENT

☐ SAMPLE

☐ COLOR SAMPLE

☐ _____

DESCRIPTION:

PRODUCT NAME: _____

MANUFACTURER: _____

SUBCONTRACTOR/SUPPLIER: _____

ENGINEER REVIEW STAMP

☐ NO EXCEPTION TAKEN ☐ REVISE AND RESUBMIT
☐ FURNISH AS CORRECTED ☐ REJECTED

Checking is only for conformance with the design concept of the project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication process or to techniques of construction, and for coordination of the work of all trades.

TOWNE ENGINEERING
Consulting Engineers

Date _____ By _____

CONTRACTOR REVIEW STAMP

REMARKS: _____

SECTION 22 56 05

GENERAL PROVISIONS, PIPING SYSTEMS

PART 1 – GENERAL

1.01 STANDARDS

- A. Pipe, tube and fittings shall comply with governing codes and shall conform to the applicable standards of ASTM, ASME, ASCE, ANSI and AWWA.

1.02 OPTIONS

- A. Whenever copper and ferrous piping systems are specified two (2) inches and smaller and two and one-half (2-1/2) inches and larger, respectively, copper piping systems may be provided (in consistent fashion, by piping system) for sizes four (4) inches and smaller (unless otherwise noted).
- B. Ferrous (excluding cast iron) piping systems are generally specified with screwed joints and fittings serving sizes two (2) inches and smaller and with flanged joints and weld fittings or (for designated systems) grooved joints and fittings serving sizes two and one-half (2-1/2) inches and larger; unless otherwise noted, flanged joints and weld fittings or (for designated systems) grooved joints and fittings may be provided (in consistent fashion, by piping system) for piping one and one-half (1-1/2) inches and larger and/or screwed joints and fittings for sizes four (4) inches and smaller.
- C. Copper piping systems are generally specified with soldered joints; mechanical joints (for designated systems) may be provided (in consistent fashion, by piping system).
- D. Bronze body valves are generally specified with screwed ends; unless otherwise noted, solder ends (in strict accordance with the listed parameters) may be provided (in consistent fashion, by piping system) for copper piping systems.

1.03 MATERIAL LISTS

- A. Prior to installation, submit a list of materials to the Engineer for approval that shall conform with the following:
 - 1. Each piping system (including pipe material, pipe joints, fittings, valves, etc.) shall be listed separately.
 - 2. Listings of pipe material, pipe joints (including the associated joining materials) and fittings shall be complete with a description of all parameters contained in the bidding documents (schedule number, material, pressure classification, standards, etc.). THE ENGINEER WILL NOT TRANSFER INFORMATION FROM THE BIDDING DOCUMENTS TO THE LISTINGS. INCOMPLETE LISTINGS WILL BE DISAPPROVED.
 - 3. Listings of valves shall be similar to those for pipe material, pipe joints and fittings and shall be complete with the manufacturer's product description literature. INCOMPLETE LISTINGS WILL BE DISAPPROVED.

PART 2 – PRODUCTS

2.01 ACCEPTABLE VALVE MANUFACTURERS

- A. Valves:
 - 1. Apollo, Crane, Fairbanks, Jenkins, Keystone, Lukenheimer, Nibco, Powell, Stockham or approved equal.
- B. Mechanical joint systems:
 - 1. Ridgid, Viega or approved equal.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Changes in direction shall be made through fittings, except that welding outlet fittings may be used for branch piping two (2) inches and larger, provided the branch piping is a minimum of two pipe sizes smaller than the associated main piping.
 - 2. Provide isolating valves at equipment requiring service.
 - 3. Provide unions, flanges or disconnects required to facilitate convenient equipment removal.
 - 4. Provide anchors, swings, thrust blocks, tie rods, flexible connectors, etc. required to prevent noise and allow for expansion.
- B. Above grade:
 - 1. Furnish and install piping substantially as shown on the drawings, as high as possible (except that piping shall generally be run below ductwork to facilitate access to valves, vents, flow meters, etc.), parallel to building walls, clear of structural members (except when penetrations are shown or approved) and clear of equipment removal areas.
- C. Below grade:
 - 1. Furnish and install piping substantially as shown on the drawings, parallel to building walls (except where shown otherwise) and in strict accordance with the designated inverts.
 - 2. Provide trenching, backfilling and compacting in accordance with the requirements set forth in Division 2 and/or as shown on the drawings.
 - 3. Plug or cap open ends when work is stopped and thoroughly flush (using water flowrates with velocities of five to six ft/sec) upon completion of work.

D. Sleeves:

1. Provide sleeves at ALL points (unless otherwise noted or specified) where piping systems pass through building walls, floors and partitions:
 - a. Units penetrating walls below grade shall be as detailed (Sleeves Below Grade).
 - b. Units penetrating floors shall be Schedule 40, black steel (ASTM A-53) arranged to provide a waterproofing flange by projecting 1/2" above finished floor (except in Mechanical/Electrical Equipment Rooms where the projection shall be 2" above finished floor).
 - c. Units penetrating walls or partitions (constructed of masonry and/or fire or smoke rated) shall be Schedule 40, black steel (ASTM A-53), neatly fitted and sealed to the associated opening.
 - d. Units penetrating walls or partitions (not constructed of masonry nor fire or smoke rated) shall be neatly fitted and not require sleeves.
 - e. Openings through existing walls or partitions constructed of solid masonry shall be core drilled and shall not require sleeves.
2. Seal annular spaces with intumescent, synthetic elastomer (3M brand fire barrier; Caulk CP 25, Putty 303).

E. Escutcheons:

1. Provide chrome plated flat plate type escutcheons at ALL POINTS where EXPOSED piping systems pass through building walls, floors and partitions in FINISHED areas.

F. Painting:

1. Provide rust inhibitive primer and two finish coats for uninsulated, exposed exterior and interior, ferrous piping systems; color as noted, scheduled or directed.

3.02 TESTS

- A. Piping systems tests herein specified shall be conducted in the presence of the authority having jurisdiction before backfilling, concealment and/or insulation as applicable and all leaky joints shall be remade and retested.

END OF SECTION

SECTION 22 56 15

SANITARY WASTE AND VENT PIPING SYSTEMS, ABOVE AND BELOW GRADE

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete above and below grade sanitary waste and vent piping systems in accordance with the sizes and locations shown on the drawings.

PART 2 – PRODUCTS

2.01 DESCRIPTION

- A. Pipe material:
 - 1. Rigid, Schedule 40, polyvinyl chloride (PVC) conforming to ASTM Specification D-1785.
- B. Pipe joints:
 - 1. Solvent cement type.
- C. Fittings:
 - 1. Rigid, Schedule 40, polyvinyl chloride (PVC) conforming to ASTM Specification D-1785.

PART 3 – EXECUTION

3.01 TEST

- A. Test the entire sanitary waste and vent system (new work, isolated from existing) hydrostatically at 5 psig, minimum.
- B. The system shall be leak-tight after a 3-hour duration.

END OF SECTION

SECTION 22 56 18

STORM DRAINAGE PIPING SYSTEMS, ABOVE AND BELOW GRADE

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete above and below grade storm drainage piping systems in accordance with the sizes and locations shown on the drawings.

PART 2 – PRODUCTS

2.01 DESCRIPTION

- A. Pipe material:
 - 1. Rigid, Schedule 40, polyvinyl chloride (PVC) conforming to ASTM Specification D-1785.
- B. Pipe joints:
 - 1. Solvent cement type.
- C. Fittings:
 - 1. Rigid, Schedule 40, polyvinyl chloride (PVC) conforming to ASTM Specification D-1785.

PART 3 – EXECUTION

3.01 TEST

- A. Test the entire storm drainage system (new work, isolated from existing) hydrostatically at 5 psig, minimum.
- B. The system shall be leak-tight after a 3-hour duration.

END OF SECTION

SECTION 22 56 49

PIPING SYSTEMS HANGERS AND SUPPORTS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install piping systems hangers and supports for the piping systems shown on the drawings.

1.02 STANDARDS

- A. Units, including piping system attachments, structural attachments, hanger rods, anchors, bracing, alignment guides and all necessary accessories shall be in accordance with ANSI Standard B31.1 and MSS Standard SP-58.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. F & S, Carpenter & Patterson, Fee & Mason, Grinnell.

2.02 DESCRIPTION

- A. Basic components (piping system attachments, structural attachments, hanger rods, alignment guide, etc.):
 - 1. Stock, production units.
- B. High density insulation filler pieces:
 - 1. Molded, rigid urethane, thickness equal to that of the specified adjoining insulation, 6 inches long, 4 lbs/cu ft, 0.03 perm inches (ASTM Specification C-355, dry cup), 125 lbs/sq in (compressive strength).
- C. Protective shields:
 - 1. Galvanized steel, formed to fit the adjoining insulation, 180 degrees arc.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be capable of properly supporting each piping system under operating conditions imposed by the transported medium (gas or liquid), including provisions for:
 - 1. Expansion and contraction (movement shall not cause disengagement).

2. Preventing excessive stress.
 3. Threaded vertical adjustment subsequent to installation.
 4. Shock absorbing devices as required.
- B. Hanger rods shall be subjected to tensile loads only; where axial or lateral movements are anticipated, suitable linkages shall be provided.
 - C. Piping system attachments serving copper piping systems shall be copper clad.
 - D. Structural attachments shall be secured to the building structural system (as shown), NOT to ROOF decks or components of the mechanical and electrical systems (ductwork, piping, conduit, etc.); however, attachments serving piping 2 inches and smaller may be secured to FLOOR decks.
 - E. Hangers and/or supports for cast iron piping shall be within 18 inches of each joint (both sides).
 - F. Piping systems support shall be completely independent of the associated equipment and terminals.

END OF SECTION

SECTION 22 56 50

FLASHING

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install flashing serving roof drains and piping penetrating the building roof.

PART 2 – PRODUCTS

2.01 DESCRIPTION

- A. Roof drain application:
 - 1. 4-pound lead, extending 6 inches beyond the drain pans, securely held by clamping rings.
- B. Piping roof penetration application:
 - 1. 14-ounce cold rolled copper, extending 12 inches beyond the piping and within 2 inches of top, counter flashing extending 1 inch inside piping and overlapping flashing 4 inches.

END OF SECTION

SECTION 22 56 51

CLEANOUTS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install cleanouts in accordance with the locations shown on the drawings, where required by code and where necessary to facilitate the maintenance of sanitary and storm systems.
- B. Units shall be compatible with all design parameters shown on the drawings and as herein specified, complete with features and all necessary accessories required for a coordinated installation (carpet markers, recess for tile, access cover, etc.).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Josam, Smith, Wade, Zurn or approved equal.

2.02 DESCRIPTION

- A. Units for installation in floors:
 - 1. Body:
 - a. Cast iron, round, 2-piece, adjustable, flashing clamp (as applicable).
 - 2. Plug:
 - a. Bronze, screwed, lead or neoprene seal.
 - 3. Top:
 - a. Pedestrian and light wheel traffic:
 - 1) Nickel alloy, scoriated, round or square (as appropriate), secured, carpet marker (as required).
 - b. Heavy wheel traffic:
 - 1) Cast iron, scoriated, round, loose set.
- B. Units for installation in piping:
 - 1. Body:
 - a. Cast iron, wye (preferred) or tee (as required).

2. Plug:
 - a. Bronze, screwed, lead or neoprene seal.
3. Access cover:
 - a. Polished brass, frame (as required), secured.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be line size for pipe sizes up to and including 4-inch, 4-inch for pipe sizes 5-inch through 8-inch, and 6-inch for pipe sizes 10 inches and larger.
- B. Units serving non-ferrous and ferrous piping systems shall possess similar features.

END OF SECTION

SECTION 22 56 52
SHOCK ABSORBERS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install shock absorbers in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be the hydro-pneumatic type.
- C. Units shall be NSF 372 and NSF 61 compliant.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Josam, Smith, Wade, Zurn or approved equal.

2.02 DESCRIPTION

- A. Basic unit:
 - 1. Polished stainless steel shell, enclosed charging device, flow control orifice, elastomer bellows.
 - 2. Hydraulic displacement fluid, inert gas pneumatic displacement cushion.
- B. Accessories:
 - 1. Threaded female coupling.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Arrange units to effectively dampen hydrodynamic shock, complete with provision for access as required.

END OF SECTION

SECTION 22 56 60

FIXTURES

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install fixtures in accordance with the parameters shown on the drawings and herein specified.
- B. Units shall be complete with all necessary supports, equipment, trim, fittings, accessories and connections to the associated piping systems.
- C. Units shall comply with flowrate parameters set forth by the New York State Department of Environmental Conservation and the requirements mandated by the Americans with Disabilities Act (ADA).

1.02 SUBMITTALS

- A. Fixture submittals shall be tendered in bound form with a designated, indexed section for each type.
- B. Fixture descriptions shall include:
 - 1. Alphanumeric designation (matching bidding documents) and corresponding generic description.
 - 2. Product literature edited and highlighted to indicate all parameters set forth in the bidding documents.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Vitreous china, enameled cast iron, enameled steel units:
 - 1. Gerber, American Standard, Toto, Kohler or approved equal.
- B. Stainless steel sinks:
 - 1. Elkay, Just or approved equal.
- C. Molded stone service sinks:
 - 1. Fiat or approved equal.
- D. Trim:
 - 1. Faucets and fittings:

- a. Chicago Faucet, Speakman, T & S or approved equal.
- 2. Flush valves:
 - a. Sloan, Zurn or approved equal.
- 3. Solenoid operators:
 - a. Sloan Optima Plus or approved equal.
- E. Seats:
 - 1. Beneke, Bemis, Church, Osonite or approved equal.
- F. Supports:
 - 1. Carriers:
 - a. Josam, Smith, Wade, Zurn or approved equal.
 - 2. Roughing:
 - a. Sumner or approved equal.

2.02 DESCRIPTION

- A. General:
 - 1. Units shall be constructed of materials free from defects in a manner of first class workmanship.
 - 2. Units shall be suitable for service corresponding to the working pressures specified for the associated piping systems.
 - 3. Vitreous china units shall be "first quality", vitreous china, thoroughly fused and vitrified to a homogeneous mass, white (unless otherwise scheduled).
 - 4. Enameled cast iron units shall be one piece high grade cast iron with a thoroughly fused enamel surface, white (unless otherwise scheduled).
 - 5. Enameled steel units shall be suitable for cold drawing, with a thoroughly fused enamel surface, white (unless otherwise scheduled).
 - 6. Unless otherwise shown or herein specified, all associated trim and exposed piping (including valves, fittings, escutcheons, etc.) shall be (polished) chromium plated.
- B. Water closets:
 - 1. Basic unit:
 - a. Flush valve type:

- 1) Vitreous china, elongated bowl (unless otherwise scheduled), 2-1/4" passageway, siphon jet action.
2. Trim:
 - a. Flush valve:
 - 1) Diaphragm type, screwdriver check angle stop with vandal resistant cap, vacuum breaker, adjustable tailpiece, spud coupling and flange, cover tube, escutcheon.
 - 2) Non-hold-open handle operator:
 - a) ADA compliant.
 - b) Triple seal packing.
 - 3) Solenoid operator:
 - a) General:
 - (1) ADA compliant.
 - (2) Battery powered.
 - b) Sensor:
 - (1) Infrared.
 - (2) Replaceable lens window.
 - c) Solenoid valve:
 - (1) Low energy latching.
 - (2) Self-cleaning bypass, integral strainer/filter.
 - d) Features:
 - (1) Self-adaptive sensor range adjustment.
 - (2) Flush delay.
 - (3) Courtesy flush.
 - (4) Sentinel flush.
 - (5) Low battery LED indication.
 - (6) Mechanical override.
 - 4) Bedpan washer:

- a) Diverter valve, balanced pivot assembly.
- b) Spray arm.

3. Seat:

- a. Extra heavy solid plastic, modified open back, integral molded bumpers, [white] (unless otherwise scheduled).
- b. Self-sustaining, stainless steel, check hinge.

4. Support:

- a. Adjustable single or back-to-back carrier (as applicable), arranged to accommodate prevailing circumstances.
- b. Cast iron body with pylon feet, face plate, coupling, nipple, extension, gaskets, zinc plated fasteners.

C. Urinals:

1. Basic unit:

- a. Vitreous china, extended shields, integral flush spreader, slanted front rim, integral trap.
- b. Blowout, siphon jet or washout flushing action as scheduled.

2. Trim:

- a. Diaphragm type flush valve, screwdriver check angle stop with vandal resistant cap, vacuum breaker, adjustable tailpiece, spud coupling and flange, cover tube, escutcheon.
- b. Non-hold-open handle operator:
 - 1) ADA compliant.
 - 2) Triple seal packing.
- c. Solenoid operator:
 - 1) General:
 - (1) ADA compliant.
 - (2) Battery powered.
 - 2) Sensor:
 - a) Infrared.

- b) Replaceable lens window.
 - 3) Solenoid valve:
 - a) Low energy latching.
 - b) Self-cleaning bypass, integral strainer/filter.
 - 4) Features:
 - a) Self-adaptive sensor range adjustment.
 - b) Flush delay.
 - c) Courtesy flush.
 - d) Sentinel flush.
 - e) Low battery LED indication.
 - f) Mechanical override.
- 3. Support:
 - a. Adjustable single carrier, arranged to accommodate prevailing circumstances.
 - b. Floor mounted block bases, structural steel uprights, support plate, bearing plate, adjustable supporting rods.
- D. Lavatories:
 - 1. Basic unit:
 - a. Wall hung:
 - 1) Vitreous china, designed for concealed arm support, integral backsplash, concealed front overflow.
 - b. Wall hung handicapped:
 - 1) Vitreous china, designed for concealed arm support and wheel chair occupants, ledge back, curved front, shallow basin, concealed rear overflow.
 - c. Counter top:
 - 1) Vitreous china, self-rimming, concealed front overflow (rear, handicapped application).
 - 2. Trim:
 - a. General:

- 1) Solid cast bronze.
 - 2) Perforated strainer, 1-1/4" tailpiece (offset, handicapped application).
- b. Faucet:
- 1) Easily replaceable cartridge.
 - 2) Integral flow control, heavy duty seat.
 - 3) Heavy duty, forged brass, service indexed handles or wrist blades as scheduled.
- c. Solenoid operator:
- 1) General:
 - (1) ADA compliant.
 - (2) Battery powered.
 - (2) Hardwired:
 - (a) Vandal resistant chrome plated wall plates.
 - (b) Control transformer.
 - 2) Spout:
 - a) Cast brass.
 - b) Pressure compensating flow control.
 - c) Integral sensor.
 - 3) Sensor:
 - a) Infrared.
 - b) Replaceable lens window, jacketed wiring.
 - 4) Solenoid valve:
 - a) Low energy latching.
 - b) Self-cleaning bypass, integral strainer/filter.
 - 5) Features:
 - a) Self-adaptive sensor range adjustment.

- b) Adjustable continuous detection operating time.
 - c) Splash proof control module.
 - d) Low battery LED indication.
 - 6) Accessories:
 - a) Centerset trim plate.
 - b) Concealed thermostatic mixing valve.
 - c) Vandal resistant enclosure.
- 3. Supplies:
 - a. Wall supply, nipple-to-wall, escutcheon, quarter turn stop.
 - b. ADA compliant piping cover, IPS Truebro Lavguard or equal.
- 4. Trap:
 - a. Adjustable P Type, 17 gauge cast brass body, slip inlet, ground swivel joint, cleanout plug, escutcheon, 1-1/4" x 1-1/2".
 - b. ADA compliant piping cover, IPS Truebro Lavguard or equal.
 - c. Anti-scald mixing valve, Caleffi /Sink Mixer 5212 or equal.
 - 1) Compliant with ASSE 1070 / ASME 112.1070.
- 5. Support:
 - a. Adjustable single or back-to-back carrier (as applicable), arranged to accommodate prevailing circumstances.
 - b. Invertible cast iron headers, floor mounted, block bases, steel pipe uprights, concealed arms, leveling and securing screws.
- E. Sinks:
 - 1. Basic unit:
 - a. Countertop (stainless steel):
 - 1) 18 gauge, Type 302, seamlessly drawn stainless steel; satin finish, undercoating (bottom and sides).
 - 2) Self-rimming, recessed faucet ledge and compartment.
 - b. Counter top (vitreous china):
 - 1) Self-rimming, concealed front overflow.

- c. Wall hung (vitreous china):
 - 1) Designed for concealed arm support, integral backsplash, concealed front overflow.
- 2. Trim:
 - a. General:
 - 1) Solid cast bronze.
 - 2) Perforated strainer, 1-1/4" tailpiece.
 - b. Faucet:
 - 1) Easily replaceable cartridge.
 - 2) Integral flow control, heavy duty seat.
 - 3) Heavy duty, forged brass, service indexed handles or wrist blades as scheduled.
 - 4) Accessories:
 - a) Centerset trim plate.
 - b) Concealed thermostatic mixing valve.
 - c) Vandal resistant enclosure.
- 3. Supplies:
 - a. Wall supply, nipple-to-wall, escutcheon, quarterturn stop.
 - b. ADA compliant piping cover, IPS Truebro Lavguard or equal.
- 4. Trap:
 - a. Adjustable P type, 17 gauge cast brass body, slip inlet, ground swivel joint, cleanout plug, escutcheon, 1-1/4" x 1-1/2".
 - b. ADA compliant piping cover, IPS Truebro Lavguard or equal.
- 5. Support:
 - a. Adjustable single or back-to-back carrier (as applicable), arranged to accommodate prevailing circumstances.
 - b. Invertible cast iron headers, floor mounted, block bases, steel pipe uprights, concealed arms, leveling and securing screws.

F. Service sink:

1. Basic unit:
 - a. Low silhouette, one piece, homogeneous white molded stone.
 - b. Cast brass drain body, dome strainer, lint basket, vinyl bumperguard.
2. Trim:
 - a. Solid cast brass, spout with pail hook, adjustable wall brace, integral stops, vacuum breaker.
3. Hose and hose bracket:
 - a. 5/8" diameter x 30" long heavy duty, cloth reinforced rubber hose, 3/4" chrome plated couplings.
 - b. 5" long x 3" wide stainless steel bracket with rubber grip.
4. Mop hanger:
 - a. 24" long x 3" wide, 18 gauge stainless steel, 3 rubber tool grips.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be set securely, level and plumb with joints at building surfaces neatly caulked.
- B. Roughing shall be neatly arranged and anchored using high impact polystyrene supports complete with stainless steel bands, clamps and fasteners.
- C. Whenever scheduled and/or noted on the drawings or herein specified, units shall be in strict conformance with the requirements set forth by the Americans with Disabilities Act (ADA), including:
 1. Arrangement, clearances, roughing dimensions.
 2. DHW piping arrangement, insulation/protection.

END OF SECTION

SECTION 22 56 70

FLOOR DRAINS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install floor drains in accordance with the sizes and locations shown on the drawings.
- B. Units shall conform with the parameters shown on the drawings and as herein specified, complete with body, strainer, deep seal trap and accessories required for a properly coordinated installation.

1.02 SUBMITTALS

- A. DRAIN SUBMITTALS SHALL BE COMPLETE WITH A TYPEWRITTEN COVER SHEET CONTAINING A SEPARATE PARAGRAPH THOROUGHLY DESCRIBING ALL PARAMETERS OF EACH DRAIN INCLUDING ITS GENERAL AREA OF APPLICATION AND ASSOCIATED ALPHANUMERICAL DESIGNATION SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED (SUBMITTALS WITHOUT A COVER SHEET WILL BE DISAPPROVED).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Josam, Smith, Wade, Zurn or approved equal.

2.02 DESCRIPTION

- A. Body:
 - 1. 2-piece.
 - 2. Double drainage flange with weepholes.
 - 3. Non-puncturing flashing clamp.
- B. Strainer:
 - 1. Adjustable collar.
 - 2. Narrow, slotted openings.
 - 3. High area drainage.
 - 4. Vandal resistant secured.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Adjust strainer elevation to complement finished floor level.

END OF SECTION

SECTION 22 56 71

ROOF DRAINS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install roof drains in accordance with the sizes and locations shown on the drawings.
- B. Units shall conform with the parameters shown on the drawings and as herein specified, complete with body, dome/grate and accessories required for a properly coordinated installation.

1.02 SUBMITTALS

- A. DRAIN SUBMITTALS SHALL BE COMPLETE WITH A TYPEWRITTEN COVER SHEET CONTAINING A SEPARATE PARAGRAPH THOROUGHLY DESCRIBING ALL PARAMETERS OF EACH DRAIN INCLUDING ITS GENERAL AREA OF APPLICATION AND ASSOCIATED ALPHANUMERICAL DESIGNATIONS SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED (SUBMITTALS WITHOUT A COVER SHEET WILL BE DISAPPROVED).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Josam, Smith, Wade, Zurn, Froet or approved equal.

2.02 DESCRIPTION

- A. Body:
 - 1. Cast iron, 2-piece.
 - 2. Non-puncturing flashing clamp, integral gravel stop with drainage weirs.
 - 3. Adjustable collar, support ring, gasket.
 - 4. Coated, formed steel drain receiver.
 - 5. Heavy duty deck clamp.
 - 6. Combined primary/secondary drain.
- B. Dome/grate:
 - 1. Narrow, slotted openings.

2. High free area drainage.
3. Vandal resistant secured.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Adjust dome/grate elevation to complement roof insulation thickness.
- B. Calk adjustable collar/body interface.

END OF SECTION

SECTION 22 56 90

WALL HYDRANTS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install wall hydrants in accordance with locations shown on the drawings.
- B. Units shall be non-freeze box type, complete with wall casing, trim and accessories.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Josam, Smith, Wade, Zurn or approved equal.

2.02 DESCRIPTION

- A. Wall casing:
 - 1. Cast bronze, polished face, locking hinged cover.
- B. Trim:
 - 1. 3/4" H.P.T. outlet, 3/4" female and 1" male N.P.T. inlet, bronze trim, renewable nylon seats.
- C. Accessories:
 - 1. Operating handle, vacuum breaker.
- D. Josam Series 71000.

END OF SECTION

SECTION 22 56 92

ROOF HYDRANTS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install roof hydrants in accordance with the locations shown on the drawings.
- B. Units shall be non-freeze type, complete with roof support sleeve, anchoring flange, clamp collar, trim and accessories.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Zurn, Woodford or approved equal.

2.02 DESCRIPTION

- A. Head:
 - 1. Cast iron, painted finish.
- B. Body:
 - 1. Galvanized steel.
- C. Anchoring flange:
 - 1. Cast iron.
- D. Trim:
 - 1. 3/4" H.P.T. outlet, 3/4" female and 1" male N.P.T. inlet, bronze trim.
- E. Zurn Z1388, Woodford RHY2-MS.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Drain:
 - 1. Provide 3/4" PVC drain piping from drain port to nearest drain location.

END OF SECTION

SECTION 22 57 03

SUMP PUMPS, SUBMERSIBLE

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install sump pumps in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be the close coupled, single stage, submersible type; complete with pump(s), basin, cover, removal system, power cables, controls and control panel.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Weil, Chicago or approved equal.

2.02 DESCRIPTION

- A. Pump:
 - 1. Volute:
 - a. Cast iron, suction strainer.
 - 2. Impeller:
 - a. Bronze, semi-open, statically and dynamically balanced.
 - 3. Motor:
 - a. NEMA 6, submersible, Class F insulation.
 - b. Air filled, hermetically sealed.
 - c. Cast iron shell, integral cooling fins.
 - d. NEMA 6, air filled, cast iron end bell/terminal box.
 - 4. Shaft:
 - a. 300 Series stainless steel.
 - 5. Seals:
 - a. Mechanical type, double opposed arrangement.
 - 6. Bearings:

- a. Permanently lubricated ball type (20,000 hours).
- B. Basin:
 - 1. 3/16" thick high strength polyester with glass fiber reinforcing.
 - 1. Heavy duty cast iron.
 - 2. Arranged to accommodate the sizes and inverts of the associated piping.
- C. Cover:
 - 1. Steel, gasketed, arranged to accommodate removal system, controls and piping.
- D. Removal system:
 - 1. Steel base plate, cast iron discharge elbows (stationary, movable, gasketed locking devices).
 - 2. Galvanized steel guide poles, stainless steel lifting rope, rectangular access door.
- E. Power cables:
 - 1. Neoprene jacketed, armored sheathing, NEMA 6 junction box.
- F. Controls (mercury float switch type):
 - 1. Support pole, support brackets, cable, cable clamp.
 - 2. Float (polypropylene shell, molded cable connection), mercury contacts.
- G. Control panel:
 - 1. NEMA 1 enclosure.
 - 2. Fused combination magnetic starters (H.O.A.).
 - 3. Alternator, control circuit transformer.
 - 4. Pilot lights, high water alarm, alarm silence switch.

PART 3 – EXECUTION

3.01 FIELD CHECKING START-UP

- A. Unit field checking, testing and start-up (including verbal operating instructions as required and requested by the Owner's authorized representative) shall be performed by the manufacturer's authorized representative, with a copy of the results (in report form) submitted to the Engineer.

END OF SECTION

SECTION 22 57 31
DOMESTIC WATER STORAGE HEATERS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install electric domestic water storage heaters in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be the residential type; Underwriters Laboratories listed; complete with jacket, tank, anodic protection, elements, electrical components and controls.

1.02 WARRANTY

- A. Units shall be complete with ten-year warranty providing for complete replacement in the event of tank leakage due to rust or corrosion.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. A.O. Smith, Rheem, Ruud or approved equal.

2.02 DESCRIPTION

- A. Jacket:
 - 1. Heavy gauge steel, baked enamel finish, easily removable for access.
- B. Tank:
 - 1. Glass lined (alkaline borosilicate composition, fused to steel at 1500F), stainless steel dip tube (insulated from tank), factory applied extra thick heavy density fibrous glass insulation, 150 psig working pressure.
 - 2. Drain valve, pressure and temperature relief valve.
- C. Anodic protection:
 - 1. Full length extruded high density magnesium rods.
- D. Elements:
 - 1. Direct immersion type, sheathed in heavy gauge incoloy, low watt density.
- E. Electrical components:

1. Terminal block, fused control circuit transformer (120V secondary), color-coded circuitry.

F. Controls:

1. Factory mounted and wired, adjustable immersion type temperature controller, manual reset high temperature cutout.

END OF SECTION

SECTION 22 57 55
ELECTRIC WATER COOLERS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install electric water coolers in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be lead free; ADA compliant; Underwriters Laboratories listed; complete with chassis, fountain top, bubbler, bottle filling station and refrigeration system.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Elkay, Halsey-Taylor, Oasis or approved equal.

2.02 DESCRIPTION

- A. Chassis:
 - 1. Floor standing, wall hung:
 - a. Structural steel frame; removable, louvered, heavy gauge steel panels.
 - b. Baked enamel finish, color selected by Architect.
 - 2. Fully recessed:
 - a. Wall mounting box.
 - b. Removable, louvered, polished 302 stainless steel front panel.
- B. Fountain top:
 - 1. Polished, 18 gauge, 302 stainless steel.
 - 2. Anti-splash, embossed bubbler mount, integral drain.
- C. Bubbler:
 - 1. Constant flowrate pressure regulator.
- D. Bottle Filing Station:
 - 1. Sensor activated.

2. Wall mounted.
- E. Refrigeration system:
1. Compressor:
 - a. Hermetic, reciprocating, permanently lubricated.
 2. Condenser:
 - a. Air cooled, copper tube, aluminum fins, permanently lubricated fan motor.
 3. Evaporator:
 - a. Tube tank type, self-cleaning, insulated reservoir.
 4. Control:
 - a. Calibrated capillary tube, easily accessible, adjustable thermostat.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be set securely, level and plumb.
- B. Provide remote mounted refrigeration system as scheduled and/or noted.
- C. Roughing shall be neatly arranged and anchored using high impact polystyrene supports complete with stainless steel bands, clamps and fasteners.
- D. Joints at building surfaces shall be neatly caulked.

END OF SECTION

SECTION 22 57 60

INSULATION

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete insulation systems in accordance with the parameters shown on the drawings and herein specified, including the re-insulation of all equipment and/or piping systems that are shown, schedule or noted to be abated (refer to related documents), relocated and wherever “tie-ins” (new work to existing) require the removal of existing insulation.
- B. Systems shall include (unless specifically excepted as herein specified or shown and/or noted on the drawings) all associated components (pipe, fittings, valves, pumps, expansion tanks, storage tanks, equipment, accessories, etc.).

1.02 DEFINITION OF TERMS

- A. Finished areas:
 - 1. Those areas intended for habitation or occupancy where rough surfaces are plastered, paneled or otherwise finished.
- B. Unfinished areas:
 - 1. Those areas intended for use as storage or work areas where rough surfaces are not plastered, paneled or otherwise finished (e.g., unexcavated spaces, crawl spaces, certain storage rooms, equipment rooms, tunnels, etc.).
- C. Concealed spaces:
 - 1. Those spaces between ceiling and floor construction, between double walls or furred-in spaces.
- D. Exposed:
 - 1. “Open to view”.

1.03 FIRE HAZARD CLASSIFICATION

- A. Insulation systems, unless otherwise specified herein, shall have Fire Hazard Classification not to exceed Flame Spread 25 and Smoke Developed 50 when tested in accordance with ASTM Specification E-84. (Evidence of classification shall be an Underwriters Laboratories label or listing).

1.04 ENGINEER’S INSPECTION

- A. The Engineer, at his discretion, in the presence of the Contractor’s authorized representative, may take samples of installed insulation for the purpose of

checking materials and/or method of application, whereafter, the Contractor shall patch the sample areas.

1.05 LABELS

- A. Each insulation and accessory component shall bear the manufacturer's label of description.

1.06 SUBMITTALS

- A. Unless otherwise specified, submit the following for approval:
 - 1. A description of the type of insulation and all accessories (jackets, wiring, banding, fastening devices, adhesives, coatings, mastics, sealing tape, etc.) proposed for each type of service, including the manufacturer's product literature.
 - 2. Samples of insulation and/or accessories as requested.
 - 3. A SIGNED AFFIDAVIT (attached) attesting to strict compliance with the schedule mandates and installation requirements hereinafter described.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. General:
 - 1. Owens-Corning, Johns-Manville (Schuller International), Knauf, CSG, Armstrong, Dow Chemical or approved equal.
- B. Fibrous glass, 2-piece, preformed (molded) fitting, flange and valve body insulation:
 - 1. Hamfab or approved equal.
- C. Adhesives, coatings and mastics:
 - 1. Foster or approved equal.

2.02 DESCRIPTION

- A. Fibrous glass insulation:
 - 1. Density:
 - a. Pipe insulation, 4.0 lbm/cu ft.
 - b. Pipe fitting and valve body insulation, 4-5 lbm/cu ft.
 - c. Board insulation, concealed application 3 lbm/cu ft.

- d. Board insulation, exposed application 6 lbm/cu ft.
 - e. Blanket insulation, 1 lbm/cu ft.
- 2. Thermal conductivity:
 - a. Pipe, block, board and fitting insulation, 0.26 Btu/hr/sq ft/F/in at 75F.
 - b. Blanket insulation, 0.28 Btu/hr/sq ft/F/in at 75F.
- 3. Moisture absorption:
 - a. 0.2% by volume after 96 hours at 120F and 95% rh.
- 4. Capillarity:
 - a. Negligible after 24 hours.
- 5. Shrinkage or expansion:
 - a. Fully cured to insure negligible dimensional changes when tested in accordance with ASTM Specification C-312.
- B. Flexible foamed plastic insulation:
 - 1. Density:
 - a. 4.5 to 8.5 lbm/cu ft when tested in accordance with ASTM Specification D-1622.
 - 2. Thermal conductivity:
 - a. 0.28 Btu/hr/sq ft/F/in at 75F when tested in accordance with ASTM Specification C-177.
 - 3. Water vapor transmission:
 - a. 0.1 perm inches when tested in accordance with ASTM Specification C-355 (wet cup).
 - 4. Operating temperature range:
 - a. 0 to 200F.
 - 5. Fire Hazard Classification:
 - a. Flame Spread 25, Smoke Developed 150 when tested in accordance with ASTM Specification E-84.
 - 6. Thermal stability:
 - a. 7.0% shrinkage during 7 days at 200F when tested in accordance with ASTM Specification C-548.

C. Insulation jackets:

1. Class 1 jackets:

- a. Heavy duty, embossed, white Kraft paper, puncture resistance of 50 breach units, bonded to heavy duty aluminum foil (reinforced with glass fiber yarn), water vapor permeance of 0.02 perms.

2. Class 2 jackets:

- a. Heavy duty aluminum foil, (reinforced with glass fiber yarn), puncture resistance of 25 breach units, bonded to heavy duty Kraft paper, water vapor permeance of 0.02 perms.

3. Class 3 jackets:

- a. Best quality canvas, 6 ounces per square yard, 4 ounces per square yard for fittings 2 inches and smaller.

4. Class 4 jackets:

- a. High impact resistant, 0.028 inch thick, rigid, ULTRA-VIOLET RESISTANT, polyvinyl chloride, factory cut, preset curl, 1-1/2 inch overlap.

D. Wiring, banding and fastening devices:

1. Wire:

- a. No. 16 gauge, copper clad or galvanized, annealed, steel wire (unless otherwise specified).

2. Wire mesh:

- a. Woven, galvanized, (galvanized after weaving) No. 20 gauge steel wire, nominal 1 inch hexagonal openings.

3. Insulation fasteners:

- a. Adhesive secured type, installed in accordance with all necessary provisions to avoid damaging the equipment, capable of supporting an axial load of 40 lbs, sized in accordance with the thickness of the associated insulation, metal speed washer designed to secure the insulation firmly in place without excessive compression.
- b. Duro-dyne stop clips and spotter pins.

E. Adhesives, coatings and mastics:

1. Lagging adhesive/coating:

- a. Foster 30–36.
- 2. Vapor barrier coating:
 - a. Foster 30–15.
- 3. Vapor barrier mastic:
 - a. Foster 30–35.
- F. Pressure sensitive sealing tape:
 - 1. Serving Class 1 jacketed systems:
 - a. Same material as associated jacketing.
 - 2. Serving Class 2 jacketed systems:
 - a. 2 mil, smooth aluminum foil.

PART 3 – EXECUTION

3.01 INSTALLATION, GENERAL

- A. Installation shall be exemplary, EXECUTED IN A FIRST-CLASS MANNER BY SKILLED WORKERS NORMALLY ENGAGED IN INSULATION WORK.
- B. Insulation shall be applied to clean, dry surfaces after the associated distribution systems and equipment have been leak-tested, approved and accepted and shall be continuous through sleeves, wall and ceiling openings, etc.
- C. Vapor barrier jacketing shall be applied with a continuous unbroken vapor seal, including points of penetration (anchors, gauges, hangers, sensors, supports, thermometers, etc.).
- D. Adhesives, coatings and mastics shall be compatible with the materials to which they are applied and shall not soften, corrode or otherwise attack said materials whether dry or wet.
- E. Hangers, supports and appurtenances shall be installed in their permanent location before insulation is applied and shall be restored to their original position if displacement is necessary to ensure proper insulation installation.
- F. Flexible vibration eliminators serving piping systems distributing liquid and gasses below ambient shall be insulated with flexible foamed plastic insulation with circumferential and longitudinal (as applicable) butt joints adhesive sealed.

3.02 INSTALLATION, SPECIFIC

- A. Jacketing, installation (unless otherwise noted or specified):
 - 1. Class 1 jacketing:

- a. Jacketing shall be factory applied complete with pressure sensitive longitudinal sealing lap (1-1/2 inch width).
 - b. Circumferential joints shall be sealed with pressure sensitive sealing tape (3-inch width).
 - c. Longitudinal sealing laps and sealing tape shall be neatly pressed into place (with seams turned "away from view") and stapled (complete with vapor barrier coating for systems operating below ambient).
- 2. Class 2 jacketing:
 - a. Jacketing shall be factory applied.
 - b. Insulation joints shall be sealed with pressure sensitive sealing tape (3-inch width for plane joints, 5-inch width for angle joints).
- 3. Class 3 jacketing:
 - a. Jacketing shall be neatly sized with lagging adhesive/coating.
 - b. Additionally, jacketing serving systems operating below ambient shall be complete with vapor barrier coating finish.
 - c. Jacketing shall be applied with a minimum of circumferential seams and with longitudinal seams turned "away from view".
 - d. Jacketing shall be applied to fittings, flanges and valves using template patterns.
- 4. Class 4 jacketing:
 - a. Jacketing shall be neatly cemented in place using weld adhesive with longitudinal seams turned "away from view".
 - b. All voids shall be neatly sealed with silicone caulking.
- B. Insulation installation for PIPING systems:
 - 1. Piping insulation (fibrous glass):
 - a. Exposed ends for systems operating below and above ambient shall be neatly sealed with vapor barrier coating and lagging adhesive/coating, respectively.
 - 2. Piping insulation (flexible foamed plastic):
 - a. Insulation shall be the unslit type whenever feasible (slipped on the piping prior to pipe installation), or the slit type whenever the unslit type is not feasible, with circumferential and longitudinal joints adhesive sealed.

- b. Exposed ends of the insulation shall be adhesive sealed (to the piping) to provide a neat finished appearance and prevent moisture infiltration.
- 3. Fitting, flange and valve insulation (fibrous glass):
 - a. Insulation shall be the 2-piece, pre-formed (molded) type of the same material and thickness as the adjoining insulation.
 - b. Insulation applied to valves shall extend up to and include bonnets without interfering with packing glands.
 - c. Insulation shall be secured in place with No. 14 gauge copper wire with ends turned down into the insulation.
 - d. Insulation shall butt neatly and firmly against fittings, flanges and valves.
 - e. Finish:
 - 1) Insulation systems operating ABOVE ambient which are CONCEALED:
 - a) Insulation shall be covered with premolded polyvinyl chloride jacketing.
 - b) Circumferential joints shall be sealed with pressure sensitive tape (3 inch width).
 - 2) Insulation systems operating BELOW ambient that are EXPOSED or CONCEALED and ABOVE ambient that are EXPOSED:
 - a) Insulation surfaces shall be smoothed out by applying a leveling coat of insulating cement completely covering wiring.
 - b) After the insulating cement has THOROUGHLY dried, 2 layers of white, open weave, glass cloth with not less than 10 threads per inch in both directions (lapped on itself and the adjoining insulation a minimum of 2 inches) shall be neatly bedded with lagging adhesive coating and vapor barrier mastic for systems operating above and below ambient, respectively.
 - c) Finally, the installation shall be completed by applying Class 3 or class 4 jacketing as schedule.
- 4. Fitting, flange and valve insulation (flexible foamed plastic):
 - a. Insulation shall be the same material and thickness as the adjoining insulation.
 - b. Adhesive shall be the type recommended by the insulation manufacturer.

- c. Insulation seams and joints shall be adhesive sealed.
 - d. Insulation for SWEAT AND BRAZED FITTINGS shall be miter-cut pieces of pipe insulation.
 - e. Insulation for SCREWED AND WELDED FITTINGS shall be sleeved type covers fabricated from miter-cut pieces of pipe insulation, except screwed fittings 2 inches and larger which may be cut from flexible foamed plastic sheets using template patterns.
 - f. Insulation for VALVES shall be sleeved type covers fabricated from miter-cut pieces of pipe insulation, except large valves which shall be insulated with covers cut from flexible foamed plastic sheets using template patterns.
- C. Insulation installation for EQUIPMENT distributing or storing liquids and gases at temperatures BELOW ambient (flexible foamed plastic; curved, irregular and flat surfaces):
 - 1. General requirements:
 - a. Metal protrusions in direct contact with the insulated equipment shall be covered with a thickness equal to that specified for the associated equipment.
 - 2. Specific requirements:
 - a. Insulation shall be the sheet type installed with the smooth skin out.
 - b. With butt edges slightly lapped, insulation shall be secured in place by applying adhesive to both the equipment surface and the inside insulation surface and thereafter pressing the insulation into place when the adhesive has dried to a tacky state.
 - c. With adjoining sheets firmly in place, butt edges shall be spread apart and adhesive applied to both edges which shall then be firmly pressed back together and aligned.
 - d. Joints shall be staggered according to the aspect ratio of the equipment (vertical joints when height exceeds width and horizontal joints when width exceeds height) and when applied in multi-layers.
- D. Insulation installation for EQUIPMENT distributing or storing liquids and gases at temperatures ABOVE ambient (fibrous glass):
 - 1. General requirements:
 - a. Insulation applied to vertical surfaces shall be complete with properly installed supports 12 feet on center.
 - b. Insulation supports, stiffeners and other metal protrusions in direct contact with the insulated equipment shall be covered with insulation of a thickness equal to that specified for the associated equipment.

- c. Equipment manholes, hand holes, access plates, ASME stamp, nameplate, etc. shall not be insulated, with the adjacent insulation neatly beveled.
- 2. Specific requirements:
 - a. Curved and irregular surfaces:
 - 1) Insulation shall be beveled or scored to suit the equipment contours; voids shall be filled and butting edges shall be sealed with insulating cement.
 - 2) Insulation shall be secured in place with No. 14 gauge copper wire (6 inches on center) or galvanized steel bands (10 inches on center).
 - 3) Finish:
 - a) Insulation surfaces shall be smoothed out by applying a leveling coat of insulating cement to completely cover wiring and/or banding.
 - b) After the insulating cement has THOROUGHLY dried, a layer of white, open weave, glass cloth with not less than 10 threads per inch in both directions shall be neatly sized with lagging adhesive/coating.
 - c) Finally, the installation shall be completed by applying Class 3 jacketing.
 - b. Flat surfaces:
 - 1) Installation shall be as specified for curved and irregular surfaces, except that the insulation shall be secured to metal surfaces with insulation fasteners spaced 12 inches on center, both directions.
- E. Piping systems or portions thereof and equipment NOT requiring insulation (unless otherwise shown and/or specified):
 - 1. Compressed air piping systems.
 - 2. Gas piping systems and meters.
 - 3. Medical gas piping systems.
 - 4. Actual heat transfer surfaces.
 - 5. Flow meters serving domestic hot water systems.
 - 6. Discharge piping from safety and relief valves.
 - 7. Blow-down and drain piping.

8. Water piping buried in direct contact with the ground.
9. Inside conductors and storm drainage piping in crawl spaces.
10. Water meters.
11. Chrome plated components.
12. Factory insulated equipment.

END OF SECTION

SECTION 22 58 91

IDENTIFICATION

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install identification for all equipment, piping and valves.
- B. Identification shall include labels, valve location indicators and warning tape.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Seton, Brady or approved equal.

2.02 DESCRIPTION

- A. Labels:
 - 1. Equipment:
 - a. Standard, phenolic, engraved nameplates.
 - b. Appropriately sized lettering:
 - 1) Large equipment:
 - a) ¾ inch high by ½ inch.
 - 2) Small equipment:
 - a) 3/8 inch high by ¼ inch.
 - 2. Piping:
 - a. 2 inches and smaller:
 - 1) Semi-rigid plastic with pre-set curl (designed to “snap-on” with substantial overlap) sized and color-coded in accordance with ANSI Standard A 13.1, complete with pipe size and directional flow arrows.
 - b. 2 1/2 inches and larger:
 - 1) Neatly stenciled (with appropriately sized lettering indicating pipe size and directional flow arrows), 50 foot intervals.
- B. Valve location indicators:

1. 1/2 inch diameter, pressure-sensitive adhesive spot markers.
2. Color-coded:
 - a. Domestic hot water (RED).
 - b. Domestic cold water (BLUE).
 - c. Non potable water (VIOLET).
- C. Warning tape (underground utilities):
 1. 3.5 mils thick, 6 inch wide, appropriate APWA color code, heavy duty polyethylene.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Equipment labels (using the precise alphanumerical designation shown on the drawings) shall be securely mounted (in a conspicuous position) with appropriate fasteners and shall be applied to ALL equipment.
- B. Piping labels/stencils shall be located to ensure continuous systems identity; visible from below or side for concealed systems and exposed systems outside finished spaces, from top for exposed systems within finished spaces.
- C. Valve location indicators shall be adhered to suspended ceiling system grids and/or access doors at all main, branch main and branch piping valve locations.

END OF SECTION

SECTION 23 50 01
GENERAL PROVISIONS

PART 1 – GENERAL

1.01 RELATED PORTIONS OF THE SPECIFICATION

- A. Work in this division shall be subject to the applicable portions of the bidding documents.

1.02 SCOPE OF WORK

- A. Furnish and install equipment and materials required to provide a complete [heating, ventilating and air conditioning] [mechanical] system alterations.
- B. Refer [also] to ME drawings for pertinent work as applicable.

1.03 MANUFACTURER'S SAFETY DATA SHEETS (MSDS)

- A. Provide a bound, indexed assembly of pertinent equipment and materials (including applicable Subcontractor items).

1.04 CONNECTIONS TO EQUIPMENT THAT IS EXISTING AND/OR FURNISHED BY OTHERS

- A. Furnish and install branch piping serving equipment that is existing and/or furnished by others in accordance with the sizes and locations shown on the drawings complete with final connections, including provisions for shut-off and adapters as required.

1.05 FABRICATION DRAWINGS, MATERIAL LISTS AND EQUIPMENT SUBMITTALS

- A. Prior to installation, submit fabrication drawings, material lists and equipment submittals (shop drawings) for approval in accordance with the following:
 - 1. It is the intent of these specifications to define the requirements for fabrication drawings, material lists and equipment submittals. Questions regarding these requirements shall be directed to the Engineer prior to submission.
 - 2. Fabrication drawings and material lists shall conform to the requirements herein specified.
 - 3. Equipment submittals, unless otherwise specified, shall conform to the following:
 - a. Submittals shall be complete with the manufacturer's product description literature. SUBMITTALS WITH INSUFFICIENT LITERATURE WILL BE DISAPPROVED.

- b. Submittals shall include a complete listing of associated parameters contained in the bidding documents (materials, finishes, capacities, temperatures, pressures, electrical characteristics, etc.). THE ENGINEER WILL NOT TRANSFER INFORMATION FROM THE BIDDING DOCUMENTS TO THE SUBMITTALS. INCOMPLETE SUBMITTALS WILL BE DISAPPROVED.
 - c. Submittals shall be clearly marked to differentiate between the applicable and extraneous portions. THE ENGINEER WILL NOT MARK THE SUBMITTALS. UNMARKED SUBMITTALS WILL BE DISAPPROVED.
 - d. The attached Submittal Cover Sheet shall be copied, filled out and attached to EACH item submitted.
4. SUBMITTALS (INCLUDING RE-SUBMISSIONS), PREPARED AND TRANSMITTED IN ELECTRONIC FORMAT, SHALL BE ACCOMPANIED WITH A HARD COPY.
5. ADDITIONALLY, ELECTRONIC SUBMITTALS WHICH DO NOT CONFORM WITH THE ABOVE REQUIREMENTS WILL NOT BE REVIEWED, BUT RATHER DELETED WITH A CORRESPONDING TRANSMISSION: "REJECTED, NON-COMPLIANT SUBMISSION!"
6. Unless otherwise noted or herein specified, the following are required:
- a. Material lists:
 - 1) Piping systems.
 - 2) Piping hangers and supports.
 - 3) Insulation systems.
 - 4) Fire stopping.
 - b. Fabrication drawings:
 - 1) Air distribution systems.
 - 2) Piping systems.
 - 3) Refrigerant piping systems.
 - c. Equipment submittals:
 - 1) Variable refrigerant volume systems.
 - 2) Power Roof Ventilators, Centrifugal.
 - 3) Diffusers and Grilles.
 - 4) Air Systems and Hydronic Systems Test and Balance.
 - 5) Fire Dampers.
 - 6) Variable Refrigerant Flow Systems.
 - 7) Insulation

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Materials and equipment shall be in strict accordance with the parameters herein specified.

2.02 ACCESSORIES AND COMPONENTS

- A. Systems and equipment shall be complete with the necessary quantity of accessories and components required to insure a properly functioning installation.

2.04 REFRIGERANTS

- A. Chlorofluorocarbon refrigerants shall not be used in refrigeration systems.

2.05 ADJUSTABLE FREQUENCY CONTROLLERS, MOTORS AND MOTOR STARTERS

- A. Units serving driven equipment herein specified shall conform with the parameters set forth in Sections 23 55 92, 23 55 94, and 23 55 95, respectively.
- B. Refer also to Equipment/Motor-Wiring-Contractor/Motor Starter-Disconnect Schedule (ME Drawing).

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Work shall be expeditiously executed in a well-planned, organized, neat, workmanship like manner.
- B. Unless otherwise noted or herein specified, materials and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. System components shall be installed in a fashion ensuring easy serviceability.
- D. Electrical work herein specified and/or noted shall be executed in strict conformance with the National Electrical Code (NEC).
- E. Work shall be executed by tradesmen licensed as required by the authority having jurisdiction.

3.02 REMOVALS

- A. Unless otherwise noted or herein specified, equipment and materials shown and/or specified to be removed (including related accessories and appurtenances) shall become the Contractor's property and shall not be permitted to accumulate, but shall be promptly removed from the job site.
- B. The removal and disposal of glycol solutions, petroleum products, refrigerants and components containing asbestos and/or polychlorinated biphenyls (PCB's) shall be in strict conformance with governing federal, state and local regulations.

- C. Work shall be carefully executed to prevent the disruption of, or damage to, new work or existing work that is to remain.

3.03 CEILING PLENUM SPACE COORDINATION

- A. Unless otherwise shown and/or noted, mechanical/electrical distribution systems shall generally be arranged in the following descending order:
 - 1. Branch sprinkler piping and feeder conduits (highest).
 - 2. Ductwork.
 - 3. HVAC hydronic piping and plumbing piping (lowest).
- B. Gravity drainage piping systems (steam, steam condensate, sanitary, storm, etc.) shall be accommodated in context with their necessary precedence.
- C. Branch circuit conduits shall be accommodating as required.

3.04 PROTECTION

- A. Materials, equipment and accessories shall be suitably covered and protected during construction.
- B. Materials, equipment and accessories damaged during construction shall be replaced at no cost to the Owner.

3.05 SUPPORTS

- A. Provide auxiliary steel (beams, channels, angles, formed shapes, etc.) required to properly support equipment and distribution systems.
- B. Utilize galvanized components (wherever practical) or field apply two coats of corrosion resistant primer.
- C. Seismic anchorages, restraints and equipment supports shall comply with National Uniform Seismic Installation Guidelines.

3.06 FINAL CLEANING, EQUIPMENT ROOMS

- A. Remove trash and debris.
- B. Thoroughly sweep (using sweeping compound) and subsequently vacuum floors.
- C. Hand wash wall surfaces and equipment and remove any foreign substance (adhesive, extraneous paint, droppings, etc.).
- D. Damp-mop floors.

3.07 RECORD DRAWINGS

- A. Promptly record (in a neat, legible and red-color only accentuated fashion, on a complete, designated set of bidding documents containing no other markings) significant differences reflected by the actual installation (sizes, capacities, locations and features of distribution systems and equipment).

- B. Thoroughly review such recordings weekly with the Engineer's field representative and submit the completed set to the Engineer for electronic formatting.

3.08 FIELD CHECKING START-UP

- A. Provide field checking start-up for systems and equipment in accordance with the requirements herein specified.

3.09 PUNCH LIST

- A. When the Engineer is directed or requested to prepare a summary of incomplete work, the Contractor's Project Manager and Foreman shall visit the job site with the Engineer's Representative(s).
- B. Thereafter, the Contractor's Project Manager shall direct his Foreman and subcontractors to complete observed incomplete work.
- C. Finally, the Contractor's Project Manager and Forman shall visit the job site with engineer's representative(s) to determine any remaining incomplete work.
- D. As required, items B. and C. shall be repeated until work is properly completed.

3.10 SYSTEMS CHECK-OUT (COMMISSIONING)

- A. Subsequent to completing the HVAC systems, the Mechanical Contractor, in conjunction with the Engineer, shall orchestrate a demonstrative "check-out" of the systems operation.
- B. In addition to the Engineer's representative(s), the following parties shall participate:
 - 1. The Mechanical Contractor's Project Manager and Foreman.
 - 2. The major mechanical equipment suppliers' service technicians.
 - 3. The Automatic Temperature Control Subcontractor's Project Manager and Installation Supervisor.
 - 4. The Balancing Subcontractor's Job Site Technician(s).
- C. The above assembly, under the conjunctive direction of the mechanical Contractor's project manager and the Engineer's representative shall demonstrate the disposition of the system(s) sequence of operation relative to the proper response of related equipment, controlled devices, controllers and balancing influences.
- D. Shortcomings shall be defined and assigned (verbally and confirmed in writing) to the appropriate participant(s) relative to required corrective measures, including an appropriate date for completion.
- E. Thereafter, the above process will be repeated until all the requirements set forth in the bidding documents are properly satisfied.
- C. Finally, submit a detailed report to the Engineer, summarizing corrective measures and/or implemented alterations.

3.11 TESTING AND BALANCING

- A. Promptly complete all work necessary to complement testing and balancing as herein specified.
- B. Subsequently, orchestrate the on-site, simultaneous presence of the piping and sheet metal foremen, automatic temperature control technicians and testing and balancing agency representatives to assure their necessary corroborative effort.

3.12 INSTRUCTION

- A. Provide thorough, organized instruction regarding equipment and systems operation to the Owner's authorized representatives (secure written acknowledgement and forward to the Engineer); refer to respective specification sections for designated requirements.

3.13 OPERATION AND MAINTENANCE MANUAL

- A. Upon completing the material lists and equipment submittal process, submit two bound, neatly arranged, indexed Operation and Maintenance Manuals for approval.
- B. Manuals shall be contained in heavy duty, 3-ring vinyl covered loose-leaf binders (suitable sets of MANAGEABLE SIZE, like equipment and systems grouped) complete with:
 - 1. Typewritten description of contents within a clear plastic sleeve on the spine.
 - 2. Dividers with labeled, celluloid covered tabs.
 - 3. Protective plastic jacket enclosures for diagnostic software.
- C. Manuals shall contain:
 - 1. Title page delineating:
 - a. Name of project.
 - b. General nature of contents.
 - c. Name and address of Contractor and Engineer.
 - d. Applicable cross-references to related volumes.
 - 2. Table of contents listing equipment (including the associated alphanumerical designation) and the corresponding section (tab).
 - 3. Pertinent equipment information, including:
 - a. Manufacturer and serial number.
 - b. Approved submittal.
 - c. Operating and maintenance instructions.
 - d. Names, addresses and telephone numbers relative to parts and service.

4. Field checking start-up reports.
5. Test and balance reports.
6. Systems check-out (commissioning) reports.
7. Closeout documentation: (EDIT)
 - a. Waiver of liens.
 - b. Electrical inspection certificate.
 - c. Pertinent equipment warranties.
 - d. Fire alarm system test report and device addresses.
 - e. Record drawings.

END OF SECTION

Attachment: Submittal Cover Sheet

SUBMITTAL COVER SHEET

CONTRACTOR: _____

ADDRESS: _____

TELEPHONE: _____

DATE: _____

NOTE: ATTACH A COMPLETED COVER SHEET TO EACH COPY

PROJECT: CORNELL COOPERATIVE EXTENSION
MARCH PROJECT #23036

TYPE OF SUBMITTAL (CHECK):

☐ FABRICATION DRAWING

☐ MATERIAL LIST

☐ EQUIPMENT

☐ SAMPLE

☐ COLOR SAMPLE

☐ _____

DESCRIPTION:

PRODUCT NAME: _____

MANUFACTURER: _____

SUBCONTRACTOR/SUPPLIER: _____

ENGINEER REVIEW STAMP

☐ NO EXCEPTION TAKEN ☐ REVISE AND RESUBMIT
☐ FURNISH AS CORRECTED ☐ REJECTED

Checking is only for conformance with the design concept of the project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication process or to techniques of construction, and for coordination of the work of all trades.

TOWNE ENGINEERING
Consulting Engineers

Date _____ By _____

CONTRACTOR REVIEW STAMP

REMARKS: _____

SECTION 23 50 17
REFRIGERANT PIPING SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete refrigerant piping systems in accordance with the sizes and locations shown on the drawings.
- B. Systems shall comply with the requirements set forth in ASHRAE Standard 15.

PART 2 – PRODUCTS

2.01 DESCRIPTION

- A. Pipe material:
 - 1. Type L, hard copper tubing conforming to ASTM Specification B280.
- B. Pipe joints:
 - 1. Solder type, joined with high temperature silver brazing alloy.
- C. Fittings:
 - 1. Wrought solder joint type conforming to ANSI Standard B16.22.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Lay out (arrange) piping in the most direct (shortest route) fashion using the least possible fittings.
 - 2. Thoroughly clean all components prior to assembly.
 - 3. Maintain an inert gas charge (to prevent scale formation) while implementing component joining.
 - 4. Provide flexible foamed plastic bushings at all piping supports.
 - 5. Provide stop valves permitting component isolation and access ports for charging and monitoring.
- B. Liquid line:
 - 1. Arrange piping to maintain 5F subcooling at thermal expansion valve.

2. Provide check valve at the condenser discharge whenever the associated lift is greater than 10 feet.
 3. Pitch piping toward the evaporator, 1/2 inch in 10 ft.
 4. Provide replaceable-core filter drier, solenoid valve and moisture indicating sight glass.
 5. Provide a dedicated thermal expansion valve (located as close as possible) for each distributor.
- C. Suction line:
1. Arrange piping such that:
 - a. Evaporator header branches join below the lowest evaporator header.
 - b. The common connection (of evaporator header branches) rises above the evaporator before continuing.
 2. Alternate piping size horizontal/vertical as required to accommodate pressure drop limitation while maintaining oil carrying velocity including double rise arrangements as required.
 3. Pitch piping toward evaporator, 1/2 inch in 10 ft.
 4. Provide frost control and replaceable-core filter.
- D. Discharge line:
1. Arrange piping such that it rises above the condenser prior to entering.
 2. Alternate piping size horizontal/vertical as required to accommodate pressure drop limitation while maintaining oil carrying velocity including double rise arrangement as required.
 3. Pitch piping toward condenser, 1/2 inch in 10 ft.

3.02 TEST

- A. Initial testing shall include charging the high and low side of the system with dry nitrogen to pressures of 300 psig and 150 psig, respectively, and checking each joint with a soap solution.
- B. Final testing shall include charging the system with a nominal amount of the appropriate refrigerant, then charging the high and low sides of the system with dry nitrogen to pressures of 300 and 150 psig, respectively, and checking each joint with a halide leak detector. The system shall be leak-tight after a 24-hour duration.
- C. Evacuate the system (twice, with an intermittent charge of dry nitrogen) to a vacuum of 2.5 mm Hg. The system shall be leak-tight after a 12-hour duration.

END OF SECTION

SECTION 23 50 44

PIPING SYSTEMS HANGERS AND SUPPORTS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install piping systems hangers and supports for piping systems shown on the drawings.

1.02 STANDARDS

- A. Units, including piping system attachments, structural attachments, hanger rods, anchors, bracing, alignment guides and all necessary accessories shall be in accordance with ANSI Standard B31.1 and MSS Standard SP-58.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. F & S, Carpenter & Patterson, Fee & Mason, Grinnell or approved equal.

2.02 DESCRIPTION

- A. Basic components (piping system attachments, structural attachments, hanger rods, alignment guides, etc.):
 - 1. Stock, production units.
- B. High density insulation filler pieces:
 - 1. Molded, rigid urethane, thickness equal to that of the specified adjoining insulation, 6 inches long, 4 lbs/cu ft, 0.03 perm inches (ASTM Specification C-355, dry cup), 125 lbs/sq inch (compressive strength).
- C. Protective shields:
 - 1. Galvanized steel, formed to fit the adjoining insulation, 180 degree arc.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be capable of properly supporting each piping system under operating conditions imposed by the transported medium (gas or liquid), including provisions for:
 - 1. Expansion and contraction (movement shall not cause disengagement).
 - 2. Preventing excessive stress.

3. Threaded vertical adjustment subsequent to installation.
 4. Shock absorbing devices as required.
- B. Hanger rods shall be subjected to tensile loads only; where axial or lateral movements are anticipated, suitable linkages shall be provided.
 - C. Piping system attachments serving copper piping systems shall be copper clad.
 - D. Structural attachments shall be secured to the building structural system (as shown), NOT to ROOF decks or components of the mechanical and electrical systems (ductwork, piping, conduit, etc.); however, attachments serving piping 2 inches and smaller may be secured to FLOOR decks.
 - E. Piping systems support shall be completely independent of the associated equipment and terminals.

3.02 ARRANGEMENT

- A. Locate and position units to complement an associated piping system arrangement which assures proper access for maintenance and service.
- B. Position structural attachments to accommodate piping system elevations which complement a coordinated ceiling plenum space arrangement.

END OF SECTION

SECTION 23 52 84

VARIABLE REFRIGERANT FLOW SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete variable refrigerant volume systems as shown on the drawings and herein specified.
- B. System shall be the air cooled, Split, direct expansion type with factory fabricated components (tested, piped and wired in accordance with the National Electrical Code), Underwriters Laboratories' listed; complete with fan coil units, branch selector boxes, air cooled condensing units, room controllers, refrigerant specialties, electrical components, operating and safety controls (micro-processor based, self-diagnostic, building management system interfaced via BACNET protocol), warranty, and field checking start-up service.

1.02 WARRANTY

- A. System shall be complete with an overall parts and labor warranty extending two years from the Owner's acceptance and six years for the compressors.
- B. Service work shall be executed by factory trained personnel.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Daikin, Hitachi, or approved equal.

2.02 DESCRIPTION

- A. Fan coil unit:
 - 1. Cabinet:
 - a. Ceiling mounted, cassette type.
 - b. White, impact resistant, washable face panel.
 - c. Sound absorbing, foamed polystyrene insulation.
 - d. Adjustable supply air (direction/throw), concentric return air, ventilation air connection.
 - e. High efficiency filter.
 - 2. Fan/motor:
 - a. Direct drive, turbo type.

- b. Statically and dynamically balanced.
 - c. Permanent split capacitor, multiple speed, permanently lubricated.
 - d. Resilient mounting.
 - 3. Coil:
 - a. Direct expansion type, ARI certified.
 - b. 450 psig proof test, 300 psig leak test; cleaned dehydrated, dry nitrogen charged, sealed.
 - c. Heavy gauge, galvanized steel casing.
 - d. Seamless copper (suction header, tubes, distributor tubes).
 - e. Die formed aluminum fins, full collars, mechanical bond.
 - f. Drain pan, condensate pump.
- B. Branch selector box:
 - 1. Cabinet:
 - a. Heavy gauge galvanized steel.
 - b. Sound absorbing, foamed polystyrene insulation.
 - 2. Refrigerant control valves:
 - a. Directional:
 - 1) 3-way.
 - b. Volumetric:
 - 1) Electronic expansion.
 - 3. Tube in tube heat exchanger, liquid/gas separator.
- C. Condensing unit:
 - 1. Cabinet:
 - a. Welded galvanized steel frame.
 - b. Reinforced heavy gauge steel panels, access doors.
 - c. Weather resistant finish (zinc coated, phosphatized, epoxy primer, baked enamel paint).
 - 2. Compressor/motor:

- a. Direct drive, variable speed, orbiting scroll.
 - b. Distribution header.
 - c. Suction gas cooled, hermetic motor.
 - d. Service valves (suction, discharge, oil charging).
 - e. Forced lubrication, oil separator, oil level sightglass.
 - f. Crankcase heater.
 - g. Vibration isolators
3. Condenser:
- a. Coils:
 - 1) Copper tube, aluminum fin, 425 psig leak test.
 - 2) Sub-cooling circuit, liquid receiver.
 - 3) Louvered, galvanized steel mesh panels.
 - b. Fans:
 - 1) Vertical discharge, direct-drive, permanently lubricated ball bearings, thermal overload protection, decorative grilles.
 - 2) Statically and dynamically balanced.
 - 3) Low ambient head pressure control in accordance with scheduled parameters.
4. Controls:
- a. Operating:
 - 1) Capacity compensation.
 - 2) Equal runtime, anti-recycle.
 - 4) Periodic pumpdown.
 - 5) Oil recovery cycle.
 - b. Safety (cutout, manual reset):
 - 1) High condenser refrigerant pressure.
 - 2) Low compressor refrigerant suction temperature.
 - 3) High compressor motor winding temperature.

- 4) Low voltage.
- 5) Phase imbalance/loss/sequence.

D. Room controller:

- 1. General:
 - a. Hard wired.
 - b. 60F – 90F set point range.
- 2. Features:
 - a. Start/stop.
 - b. Heat/cool.
 - c. Set point adjustment.
 - d. Indication.
 - e. Fan speed selection.
- 3. Monitoring:
 - a. Status.
 - b. Operating mode.
 - c. Set point.
 - d. Fan speed.
 - e. Failure.

E. Refrigerant specialties:

- 1. Solenoid valves, electronic expansion valves.
- 2. Capillaries, filters, driers.

F. Electrical components:

- 1. Single point wiring connections.
- 2. Disconnect switches, motor controllers, contactors, service switches, relays, control transformers.
- 3. Short circuit and overload protection.

G. System operation:

- 1. General:

- a. System shall provide heating, ventilating and air conditioning in context with "Occupied" and "Unoccupied" cycles of operation.
 - b. As the collective system energy requirement varies, the air cooled condensing units microprocessors shall cycle their associated refrigerant reversing values to maintain equilibrium by respectively absorbing and rejecting energy from and to the atmosphere.
2. Occupied cycle control:
- a. System fans control:
 - 1) System fan coil units fans shall operate continuously.
 - b. System ventilation air control:
 - 1) System fan coil units shall provide ventilation air via the associated energy recovery ventilation unit.
 - c. System temperature control:
 - 1) As the required capacity for heating or cooling varies, space temperature controllers in combination with their associated fan coil units' possessive branch selector box and aircooled condensing unit shall modulate the flow of hot gas or liquid refrigerant to maintain their set point (72F/75F).
3. Unoccupied cycle control:
- a. System fans and temperature control:
 - 1) As the required capacity for heating varies, space temperature controllers in combination with their associated fan coil units' possessive branch selector box and air cooled condensing unit shall cycle the fan coil units fans and modulate the flow of refrigerant hot gas to maintain their set point (60F).
4. Monitoring:
- a. Fan coil units:
 - 1) Fan 'On'/'Off'.
 - 2) Heating/Cooling.
 - 3) Space temperature.
 - 4) Supply air temperature.
 - b. Branch selector boxes.

- 1) Heating/cooling.
 - 2) Refrigerant suction pressure.
 - 3) Refrigerant hot gas pressure.
 - c. Air cooled condensing units:
 - 1) Compressor speed.
 - 2) Refrigerant suction pressure.
 - 3) Refrigerant hot gas pressure.
 - 4) Entering air temperature.
 - 5) Leaving air temperature.
- 5. Alarms:
 - a. Fan coil units:
 - 1) Unit failure.
 - 2) Low space temperature.
 - 3) High space temperature (occupied cycle).
 - 4) Change filter.
 - b. Air cooled condensing units:
 - 1) Unit failure.
 - 2) Low refrigerant suction pressure.
 - 3) High refrigerant hot gas pressure.
 - 4) Low leaving air temperature.
 - 5) High leaving air temperature.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Electrical wiring:
 - 1. Refer to Specification Section 23570, Automatic Temperature Controls.
- B. Piping:

1. Refer to Refrigerant Piping Systems Specification Section and Manufacturers instructions.
2. Connections and/or terminations shall be executed with manufacturer furnished devices.
3. Work shall only be performed by manufacturer certified, factory trained personnel.

3.02 SUPERVISION

A. General:

1. Supervision shall be executed by a representative of the manufacturer's authorized distributor.

B. Execution:

1. Provide on-site observation throughout the system construction period lending all guidance necessary to insure a correct installation of all associated equipment, piping, wiring and controls.
2. Perform the prescribed instruction.

3.03 INSTRUCTION

- A. Provide thorough demonstrative instruction (2, 4-hour sessions) via factory trained technicians (representatives of the manufacturer's authorized distributor).
- B. Secure the Owner's written acknowledgement and submit to the Engineer.

3.04 SERVICE

A. General:

1. Service shall be executed by a representative of the manufacturer's authorized distributor.

B. Execution:

1. Subsequent to the system being placed in operation, perform on-site bi-weekly evaluations for 60 days; thereafter, monthly throughout the warranty period.
2. Institute all corrective measures necessary to assure proper operation and so advise the Owner verbally and in written form.

END OF SECTION

SECTION 23 53 00

GENERAL PROVISIONS, AIR DISTRIBUTION SYSTEMS

PART 1 – GENERAL

1.01 STANDARDS

- A. Systems shall comply with the applicable standards set forth in the following references:
 - 1. *HVAC Duct Construction Standards, Metal and Flexible* as published by the Sheet Metal and Air Conditioning Contractors' National Association, Inc., 8224 Old Courthouse Road, Tysons Corner, Vienna, VA 22180.
 - 2. *NFPA Standard 90A* in this specification shall mean the *Standard for the Installation of Air Conditioning and Ventilating Systems*, as published by the National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02110.
 - 3. *NFPA Standard 96* in this specification shall mean the *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*, as published by the National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02110.
 - 4. *ASHRAE Standard 62, Ventilation For Acceptable Indoor Air Quality*, as published by the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1791 Tullie Circle NE, Atlanta, GA 30329.

1.02 OPTIONS

- A. Whenever these specifications describe more than one system under a particular classification, it is the intent that this Contractor may exercise his option (in consistent fashion) in accordance with the same unless otherwise specifically shown on the drawings.

1.03 FABRICATION DRAWINGS

- A. Prior to installation, submit fabrication drawings to the Engineer for approval, conforming with the following:
 - 1. Drawings (1/4 inch scale, minimum) shall illustrate each air distribution system in context with ALL parameters contained in the contract documents (type, applicable standard, layout, arrangement, materials, etc.).
 - 2. Drawings shall include those portions of other work (architectural features, structural members, piping, conduit, etc.) necessary to insure a coordinated installation.
- B. Upon request, the [Engineer] will provide building background electronic files.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 INSTALLATION

A. General:

1. Ductwork shall be installed substantially as shown on the drawings, as high as possible, parallel to building walls (except where shown otherwise), clear of structural members (except where penetrations are shown or approved), clear of equipment removal areas and coordinated with other trades to avoid interferences.
2. Ductwork shall be adjusted to conform with field conditions as required, provided such adjustments are approved by the [Engineer].
3. Clean ductwork prior to installation and cover openings with plastic or metal caps to prevent the entry of dirt and/or debris.
4. Cover supply air diffusers with cheesecloth prior to operating the associated systems' fans wherever directed by the [Engineer].
5. Attach a 24 inch long, red plastic ribbon (location indicator) to volume damper operators.

B. Penetrations:

1. Neatly seal (safe-off) openings (complete with sleeves, as required) wherever ductwork penetrates walls, floors and partitions (preserving fire and/or smoke separation integrity as applicable).
2. Seal "approved" duct penetrations made by other trades (conduit, piping, structural steel, etc.).

C. Moisture conditions:

1. Low points of ductwork serving as fresh air intakes, humidification sections, coil banks, vertical connections through roofs, fume exhaust hoods and other applications where condensation may occur shall be made water-tight by soldering, brazing or welding joints and seams with materials compatible with the associated duct material and sloped up 1 inch (minimum) to adjoining non water-tight sections.

3.02 CORROSION PROTECTION

- ##### **A.**
1. Furnish and install neoprene gaskets at the junction of ductwork constructed of dissimilar metals.

3.03 TESTING AND BALANCING ASSISTANCE

- A. Review completed systems with testing and balancing agency representatives and relate variations in the actual installation from the drawings and specifications.
- B. Place all dampers (volume, fire and smoke) in their full-open position.

END OF SECTION

SECTION 23 53 01

AIR DISTRIBUTION SYSTEMS, LOW PRESSURE, LOW VELOCITY, SHEET METAL

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete low pressure, low velocity, sheet metal air distribution systems in accordance with the sizes, locations and arrangements (type of fittings, take-offs, transitions, etc.) shown on the drawings.

1.02 CLASSIFICATION

- A. Systems shall provide for 2 inches wg static pressure.

PART 2 – PRODUCTS

2.01 DESCRIPTION

- A. Basic duct construction:
 - 1. Material, construction, reinforcement, attachments, sealing, etc. shall conform with Sections I and III of the *HVAC Duct Construction Standards, Metal and Flexible*.
 - 2. Unless otherwise shown or specified, systems shall be galvanized steel.
- B. Fittings and accessories:
 - 1. Elbows, vanes, vane support, parallel flow branches, branch connections, offsets, transitions, obstructions, access doors, volume dampers, flexible connections, etc. shall conform with Section II and III of the *HVAC Duct Construction Standards, Metal and Flexible*.
- C. Joining systems:
 - 1. Less than 24 inches (shop fabricated system):
 - a. Drive slips, joints, slips, seams, locks, caps, reinforcing, gaskets, sealant, etc. shall conform with Section I and III of the *HVAC Duct Construction Standards, Metal and Flexible*.
 - 2. 24 inches and greater (prefabricated, manufactured system):
 - a. Flanges, corners, cleats, latches, gaskets, fasteners, sealant.
 - b. Mez-flange, Nexus.
- D. Hangers and supports:

1. Attachments, hangers, supports, etc. shall conform with Section IV of the *HVAC Duct Construction Standards, Metal and Flexible*.
- E. Flexible connections:
1. Units (unless otherwise specified) shall be constructed of heavy canvas or neoprene impregnated fabric.
 2. Units for connection to kitchen exhaust ducts (or other ducts operating at temperatures in excess of 100F) shall be constructed of heavy woven cloth or neoprene coated glass fabric weighing 30 ounces per square yard.
 3. Units exposed to the elements shall be constructed of neoprene coated glass fabric weighing 30 ounces per square yard.
- F. Duct Sealer:
1. Rolled sealant:
 - a. 15 mil, 100% solids, elastomeric modified butyl.
 - b. 2 mil aluminum foil finish.
 - c. Hardcast 1402/181, Underwriters Laboratories listed.
 2. Sealant:
 - a. Heavy textured, water based, polyester/synthetic resin base.
 - b. Hardcast 102/181, Underwriters Laboratories listed.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Provide access doors at branch trunk duct volume dampers, automatic control dampers, coils, humidifier distribution manifolds, smoke detectors, smoke and fire dampers, air monitoring devices, filters and other system components that require access.
- B. Carefully apply duct sealer to ensure airtight joints and seams.

3.02 APPLICATION

- A. The following systems shall be categorized as low pressure, low velocity, sheet metal air distribution systems:
 1. Supply air.
 2. Return air.
 3. Transfer air.
 4. Exhaust air.

5. Outside air.
6. Mixed air.

END OF SECTION

SECTION 23 53 20

FIRE DAMPERS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install fire dampers in accordance with the sizes and locations shown on the drawings.
- B. Units shall be the dynamic curtain type; conform with NFPA and Underwriters Laboratories Standards 90A and 555, respectively; complete with frame, blades, closure springs, fusible link and accessories.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Air Balance, Prefco, Ruskin or approved equal.

2.02 DESCRIPTION

- A. Rating classification:
 - 1. 1-1/2 hour (fire partitions less than 3 hours).
- B. Frame:
 - 1. 16 gauge galvanized steel.
- C. Blades:
 - 1. 24 gauge galvanized steel, arranged to stack outside the airstream defined by the associated ductwork dimensions.
- D. Closure springs:
 - 1. 301 stainless steel, constant force type.
- E. Fusible link:
 - 1. 165F (unless otherwise noted).
- F. Accessories:
 - 1. Galvanized steel sleeve (constructed in accordance with the *HVAC Duct Construction Standards, Metal and Flexible* as published by the Sheet Metal and Air Conditioning Contractor's National Association, Inc., factory or field fabricated).
 - 2. Sleeve mounting angles.

3. Breakaway connection (factory or field fabricated, arranged to ensure unit stability).

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be installed in accordance with the *Fire Damper and Heat Stop Guide for Air Handling Systems* as published by the Sheet Metal and Air Conditioning Contractor's National Association, Inc.
- B. Access for units serving ductwork with a nominal dimension of 12 inches and smaller shall be accommodated by a removable (flanged, gasketed) ductwork section in lieu of access door.
- C. Access points shall be visibly labeled.

END OF SECTION

SECTION 23 53 40

ROOFTOP HEATING, VENTILATING AND AIR CONDITIONING UNITS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install heating, ventilating and air conditioning units in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be the single zone, rooftop type; designed for outdoor application; factory fabricated, tested, piped and wired (in accordance with the National Electrical Code); Underwriters Laboratories listed, compliant with ASHRAE 90.1, burner shall be compliant with ANSI Z21.47b and ANSI Z83.8, and shall be safety certified by ETL and ETL US Listed; shipped as a package, complete with weatherproof cabinet, cooling section, heating section, air handling section, filter section, roof mounting curb, all necessary operating and safety controls, remote monitoring panel, warranty and field checking start-up service.

1.02 WARRANTY

- A. Units shall be complete with an overall parts and labor warranty extending 1 year from the Owner's acceptance, five years non-prorated for the motors/compressors, 25 years non-prorated for the heat exchanger.
- B. Service work shall be executed by factory trained personnel.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Aeon, Dakin, or approved equal.

2.02 DESCRIPTION

- A. Cabinet:
 - 1. Insulated (R-13 minimum; fire retardant, heavy density, closed cell), double wall with thermal break reinforced heavy G90 galvanized steel panels; weather resistant finish (epoxy primer, baked enamel paint, 2500 hour salt spray in accordance with ASTM B117-95).
 - 2. Hinged, gasketed access doors serving compressor/control, fan/heat exchanger and filter/evaporator.
- B. Cooling Section:
 - 1. Compressor:
 - a. Hermetic, direct-drive, variable speed, scroll type; crankcase heater.

- b. Positive lubrication, isolated mounting, backseating stop valves with service pressure ports.
- 2. Motor:
 - a. Suction gas cooled, $\pm$ 10% voltage fluctuation capacity.
 - b. Internal temperature and current overload protection.
- 3. Safety controls:
 - a. High and low pressure cutouts, oil pressure cutout.
 - b. Anti-recycle timer, non-recycling pumpdown, remote manual reset relay.
- 4. Evaporator section:
 - a. 6 Row, Copper tube, aluminum fin coil, 300 psig leak test.
 - b. Solenoid valve, thermostatic expansion valve, service pressure ports.
 - c. Filter drier, moisture indicator.
 - d. Hot gas bypass.
- 5. Drain pan:
 - a. 304 stainless steel, double sloped.
 - a. Arranged to serve evaporator and supply fan sections.
 - b. ½" thick, expanded foam insulation.
 - c. Drain connections (each side), P-trap.
- 6. Condenser section:
 - a. Copper tube, aluminum fin coil, sub-cooling circuit, accumulator, 425 psig leak test, guard.
 - b. Vertical discharge, electrically commutated motor driven with integral head pressure control module, statically and dynamically balanced, permanently lubricated ball bearings, integral thermal overload protection.
 - c. Refrigerant reheat coil.
- C. Heating section:
 - 1. Burner management flame safeguard control system:
 - a. Microprocessor based, non-volatile memory.
 - b. Modular, plug-in configuration; programmer, amplifier, display.

2. Insurance approval:
 - a. UL.
3. Construction (burner, heat exchanger, flue collector, drip pan):
 - a. 409 stainless steel.
4. Draft:
 - a. Integral power vented.
5. Controls:
 - a. Operating:
 - 1) Modulating (each burner section).
 - 2) temperature sensor, building management system compatible.
 - 3) Adjustable high ambient cutoff (each burner section).
 - 4) Return air humidity sensor.
 - b. Safety:
 - 1) Access interlock switch.
 - 2) Manual reset high and low gas pressure switches.
 - 3) Air proving switch.
 - 4) Reverse airflow interlock switch.
 - 5) Internal and external high temperature limit switches.
 - 6) Supply air firestat.

D. Air handling section:

1. Supply fan:
 - a. Direct Drive, unhooded, backward inclined, plenum supply fans.
 - b. Self-aligning, anti-friction, pillow block bearings (200,000 hours), extended grease fittings.
 - c. Dynamically balanced and mounted on rubber isolators.
 - d. Premium efficiency ODP motor, 200,000 hour bearings, external lubrication points .
 - e. Adjustable Frequency Controller, factory wired and mounted in unit.

2. Economizer:
 - a. Modulating, low leakage outside air damper.
 - b. Adjustable minimum outside air set point, differential enthalpy sensor.
 - c. Power exhaust (fan, motor, damper, adjustable frequency controller).
- E. Filter Section:
 1. General:
 - a. 2" thickness pleated panel MERV 8 pre-filters; 4" Thickness pleated panel MERV 13 final filters.
 - b. One spare set.
- F. Electrical components:
 1. Motors, motor controllers, contactors, switches, relays and transformers.
 2. Short circuit and overload protection.
 3. Disconnect switch, convenience outlet.
 4. Factory installed and wired 115v, 12 amp GFCI outlet in the unit control panel.
- G. Roof mounting curb:
 1. Island plenum type (designed to support entire perimeter), formed to provide counter flashing, National Roofing Contractor Association approved.
 2. 14 gauge zinc coated steel, wood nailing strip.
- H. Operating controls:
 1. Specification Section 23 55 70, '*Automatic Temperature Controls*' sequence of operation compatible.
 2. Factory Installed and Factory Provided Controller
 - 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. Controller shall be capable of stand alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.

- b. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.
- c. Controller shall include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.
- d. Constant Volume Controller
 - 1. Unit shall modulate cooling with constant airflow to meet space temperature cooling loads.
- e. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module with LCD screen and input keypad, interface module with touch screen, or with connection to PC with free configuration software. Controller shall be capable of connection with other factory installed and factory provided unit controllers with individual unit configuration, setpoint adjustment, sensor status viewing, and occupancy scheduling available from a single unit. Connection between unit controllers shall be with a modular cable. Controller shall be capable of communicating and integrating with a BACnet network.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Electric wiring:
 - 1. Wiring required to accomplish the unit control shall be the responsibility of this Contractor and installed in strict accordance with the National Electrical Code.
 - 2. Wiring shall be installed in electrical metallic tubing with compression type couplings and connectors.

3.02 FIELD CHECKING START-UP

- A. Unit field checking, testing and start-up (including verbal operating and maintenance instructions required and requested by the Owner) shall be performed by the manufacturer's authorized representative, with a copy of the results (in report form) submitted to the Engineer.

END OF SECTION

SECTION 23 53 70

POWER ROOF VENTILATORS, CENTRIFUGAL

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install centrifugal power roof ventilators in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be AMCA certified; wired in accordance with the National Electrical Code; Underwriters Laboratories listed; complete with housing, fan, motor/drive compartment, motor support assembly, motor, drive and accessories.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Carnes, Greenheck, Penn Barry or approved equal.

2.02 DESCRIPTION

- A. Housing:
 - 1. Heavy gauge aluminum.
 - 2. Support structure, fan plate, windband, curb cap, drain opening.
 - 3. Welded, heavy gauge, galvanized steel birdscreen.
- B. Fan:
 - 1. Centrifugal, airfoil blades, spun venturi inlet.
 - 2. Statically and dynamically balanced.
- C. Motor/drive compartment:
 - 1. Heavy gauge aluminum, removable.
 - 2. Exhaust airstream isolated, ventilation louvers.
- D. Motor support assembly:
 - 1. Heavy gauge galvanized steel.
 - 2. Vibration isolators.
- E. Motor/Drive:
 - 1. ½ horsepower and less:

- a. Motor:
 - 1) Single phase, premium efficiency.
 - 2) Open drip proof (unless otherwise scheduled and/or noted).
 - 3) Overload protection.
 - 4) Electronically commutated (0-10V).
 - 5) Speed Controller.
- b. Drive:
 - 1) Direct.
- 2. Greater than ½ Horsepower:
 - a. Motor:
 - 1) Polyphase, premium efficiency.
 - 2) Open drip proof (unless otherwise scheduled and/or noted).
 - b. Drive:
 - 1) 1.5 service factor.
 - 2) Variable pitch, cast iron sheaves.
 - 3) Oil-resistant, non-static belts.
 - 4) Ground, polished, corrosion resistant finished shaft.
 - 5) Permanently lubricated, pillowblock ball bearings (200,000 hours).

F. Accessories:

- 1. Roof curb:
 - a. Insulated, [12"] high, welded aluminum.
 - b. Wood nailer, aluminum liner, damper shelf, gasket, cant (raised where required).
- 2. Damper:
 - a. Heavy duty frame.
 - b. Felt edged aluminum blades.
 - c. Motor operator as scheduled, control transformer as required, wiring in liquid-tight flexible metal conduit.
- 3. Anti-condensation undercoating.

4. Disconnect switch.
5. Corrosion resistant coating as scheduled.

PART 3 – EXECUTION

3.01 FIELD CHECKING START-UP

- A. Unit field checking, testing and start-up (including verbal operating and maintenance instructions required and requested by the Owner) shall be performed by the manufacturer's authorized representative, with a copy of the results (in report form) submitted to the Engineer.

END OF SECTION

SECTION 23 54 00

DIFFUSERS AND GRILLES

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install diffusers and grilles in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be capable of meeting all air distribution parameters shown on the drawings and as hereinafter specified.

1.02 SUBMITTALS

- A. Submittals shall include a spread sheet (designating each item by alphanumeric tag, room name and number) listing a description (LS, LR, LC, LI, LB, SW, DR, PP, etc.; material, finish accessories) and all pertinent parameters shown on the drawings (airflow, throw/direction/terminal velocity, pressure drop, sound rating, etc.).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Carnes, Krueger, Price, Titus or approved equal.

2.02 DESCRIPTION

- A. Diffuser (louvered, square), D-1:
 - 1. Designed to minimize smudging, alternative (1-way, 2-way opposite, 2-way corner, 3-way, 4-way) directional pattern as shown, fully adjustable pattern (capable of changing the air diffusion pattern from 360 degrees horizontal to vertical without removing core).
 - 2. Round, square or rectangular neck as shown (square-to-round transition adaptor as scheduled).
 - 3. Removable center core (permitting easy access to accessories), duct mounting rings, adjustable equalizing device (suitable for straightening and proportioning air distribution within the diffuser).
 - 4. Opposed blade volume control (where indicated on the drawings), air turning devices (suitable for mounting in the duct collar), blankoff baffles (as applicable and required to provide air direction patterns shown on the drawings).
 - 5. Tight fitting margins for optimum ceiling appearance.

- B. Diffuser (linear, slot type, incremental), D-2:
 - 1. Slot size and number as noted, 180 degrees air pattern adjustment.
 - 2. Mounting frames (as required) with positive holding concealed fasteners.
 - 3. Insulated plenum.
- C. Diffuser (sidewall), D-3:
 - 1. Double deflection arrangement, blade deflection as noted.
 - 2. Opposed blade volume control (where indicated on the drawings), air turning devices, gasket.
- D. Grille (perforated panel, square or rectangular), G-1:
 - 1. Perforated face panel, compatible with duct or plenum type return air system as shown.
 - 2. Black painted rear panel surface (side visible through face panel).
 - 3. Opposed blade volume control (where indicated on the drawings).

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Units shall be complete with design features and all necessary accessories required for coordinated installation (i.e. suitable for installation in exposed grid, concealed spline, plaster, metal pan, etc. as applicable).

3.02 PERFORMANCE

- A. Units shall diffuse air uniformly throughout the conditioned space (based upon a 20F temperature differential between the average room and supply air temperatures) with velocities in the occupied zone (5 feet above the floor and no closer than 6 feet from a wall) less than or equal to 30, 50 and 75 fpm at temperature differentials (between room and supply air temperature) less than or equal to 2, 1.5 and 1 degree F, respectively.

END OF SECTION

SECTION 23 54 11

VARIABLE AIR VOLUME TERMINALS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install variable air volume terminals in accordance with the sizes, capacities and locations shown on the drawings.
- B. Units shall be factory fabricated, pressure independent type; complete with cabinet, airflow controlled device, hot water heating coil or electric heating coil as scheduled accessories and operating control components.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Carrier, Enviro-Tec, Johnson Controls, Trane or approved equal.

2.02 DESCRIPTION

- A. Casings:
 - 1. Insulated (1/2" thick, 1-1/2 lbm density, fibrous glass, foil-faced lining), 22 gauge galvanized steel.
 - 2. Inlet collar, flanged discharge connection, access door.
- B. Air controlled device:
 - 1. 16 gauge galvanized steel multiple blade damper/frame, 90° travel (to assure uniform airflow throughout capacity range), open cell foam seals.
 - 2. Steel linkages, nylon self-lubricating bearings.
- C. Electric heating coil:
 - 1. Housing:
 - a. Heavy gauge corrosion resistant steel, insulated terminal box.
 - 2. Elements:
 - a. Nickel (80%) – chromium (20%) Type A resistance wire, stainless steel terminals, ceramic bushings, mounting brackets.
 - b. 600V, balanced stages (as applicable).
 - 3. Overtemperature protection:

- a. Primary:
 - 1) Automatic reset (disc and capillary tube type, 140F).
- b. Secondary:
 - 1) Manual reset (160F).
- 4. Airflow interlock:
 - a. Differential pressure type, diaphragm operated, velocity probe.
- 5. Accessories:
 - a. Mercury contactors (de-energizing and disconnecting), control circuit transformer, fuses (as applicable), disconnect switch (door interlocked).
 - b. Silicon control rectifier.
- 6. Indication:
 - a. "Heater On" (each stage).
 - b. "Airflow Failure".
- D. Operating control components:
 - 1. Suitable for control system interface (refer to Automatic Temperature Controls, Specification Section 23 55 70), factory mounted and wired.
 - 2. Airflow sensor, control transformer, damper actuator, control terminal strip.
 - 3. Silicone controlled rectifier, 4-20 milliamperes.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Support units securely from building structure complete with secondary framing.
- B. Position units to facilitate maintenance.

END OF SECTION

SECTION 23 55 70

AUTOMATIC TEMPERATURE CONTROLS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install complete automatic temperature control system as shown on the drawings and herein specified.
- B. System shall be the distributed-processing, direct digital control (DDC), non-proprietary communication protocol, building management system (BMS) type ; networked for single point programming and information sharing; CAPABLE OF MULTI-SITE INTERFACE VIA PASSWORD SECURED INTERNET OR OWNER NETWORK ACCESS; complete with master station hardware, programmable control modules, specific function control modules, software, portable editing device (laptop computer), dampers, valves, actuators, sensors, ancillary controllers, relays, switches, start-up service and all necessary accessories required to accomplish the sequences herein specified.
- C. System shall interface with microprocessor controlled equipment (Variable Refrigerant Flow systems, Packaged Rooftop Heating, Ventilating and Air Conditioning units) complete with monitoring, alarms and set point adjustment.
- D. PROVIDE ON-SITE TECHNICAL ASSISTANCE AS REQUESTED DURING TESTING AND BALANCING.

1.02 SUBMITTALS

- A. ALL REFERENCES TO EQUIPMENT, CONTROLLERS, CONTROLLED DEVICES, ETC. **SHALL MATCH EXACTLY** THE TITLES AND ALPHANUMERIC DESIGNATIONS SHOWN IN THE BIDDING DOCUMENTS.
- B. THE SEQUENCES OF OPERATION (EXCEPT FOR THE INSERTION OF REFERENCES TO SPECIFIC DEVICES) **SHALL MATCH PRECISELY THE VERNACULAR OF THIS SPECIFICATION**; UPON REQUEST, THE ENGINEER WILL PROVIDE DIGITAL FILES.
- C. THE SYSTEMS SCHEMATICS CONFIGURATION **SHALL MATCH EXACTLY** THOSE SHOWN IN THE BIDDING DOCUMENTS; UPON REQUEST, THE ENGINEER WILL PROVIDE DIGITAL FILES.
- D. The SYSTEMS GRAPHICS **SHALL MATCH EXACTLY** THOSE SHOWN ON THE BIDDING DOCUMENTS AND SHALL BE INCLUDED AS A DESIGNATED PART OF THE SUBMITTAL IN ELECTRONIC FORMAT; UPON REQUEST, THE ENGINEER WILL PROVIDE DIGITAL FILES.

1.03 GUARANTEE

- A. The system shall be guaranteed to be free from defects in materials and workmanship for a period of 2 years from the date of final acceptance by the

Owner, during which time all above mentioned defects shall be corrected and all services incidental to proper performance shall be provided free of charge.

1.04 START-UP

- A. System start-up shall include the provision of initial programming, setting, testing and checking and all subsequent programming modifications and adjustments required to insure proper operation.
- B. Seasonal related influences for heating and cooling shall be appropriately phased.

1.05 INSTRUCTIONS

- A. Instructions for system operation (as required and/or requested throughout the guarantee period by the Owner's authorized representative) shall consist of 2, 4-hour sessions requiring written acknowledgement (refer to "Owner Instruction Log", attached).

PART 2 – PRODUCTS

2.01 ACCEPTABLE SUBCONTRACTORS

- A. Johnson Controls or approved equal.

2.02 DESCRIPTION

- A. Master station hardware:
 - 1. Central processing unit (CPU):
 - a. Microprocessor:
 - 1) Intel core i7, 10th generation.
 - b. Memory:
 - 1) Random access (RAM):
 - a) 16 gigabytes DDR4.
 - 2) Storage (read/write):
 - a) 1,0246 gigabytes PCIE NVME solid state drive.
 - c. Communication ports:
 - 1) 1 Gbps/100 Mbps ethernet adapter.
 - 2) 4 USB Gen 3.2.
 - d. Graphics Adapter:
 - 1) 2560 x 1440 pixel resolution minimum.

- 2) 32 bit color quality.
 - e. Integral time clock real time clock, RTC.
 - f. HP, Dell, ACER, Lenovo.
- 2. Peripheral hardware:
 - a. Monitor:
 - 1) 21 inch LCD flat panel display.
 - 2) 1900 x 1280 pixel resolution, maximum.
 - b. Input devices:
 - 1) Enhanced 104 key keyboard, USB compatible.
 - 2) Optical mouse.

B. Programmable control modules (PCM):

- 1. General:
 - a. Stand-alone, microprocessor based.
 - b. Modular (allowing point expansion).
 - c. Direct digital control (DDC) algorithms (2-position, incremental, proportional, proportional plus integral, proportional plus integral plus derivative) programmed in a fashion properly complementary with the sequences herein specified.
 - d. Field programmable (local or from master station).
- 2. Input:
 - a. Analog:
 - 1) 12 bit resolution, common sensing device(s) compatible.
 - b. Binary:
 - 1) Supervised, common sensing device(s) compatible.
- 3. Output:
 - a. Analog:
 - 1) 0 to 10 VDC or 4 to 20 milliamperes.
 - 2) Designated (individual) for each controlled device.
 - b. Binary:

- 1) Continuous low voltage signal, normally open or normally closed, 3-position manual override ("On/Off/Auto") as required.
4. Alarms (audio and visual; local and master station annunciation):
 - a. Program failure.
 - b. Card failure.
 - c. Sensor failure.
 - d. Other (as herein specified).
5. Power loss protection:
 - a. Battery backup (RAM), 24 hours.
 - b. Automatic diagnostic resumption (prior to battery failure) following commercial power restoration.
 - c. Manual restoration (subsequent to battery failure) from mass storage.
6. Integral (local) display:
 - a. Monitored points.
 - b. Alarms.
7. Enclosure:
 - a. Steel, Underwriters Laboratories listed; key lock, piano hinged, full access door; baked enamel finish.
 - b. Arranged to permit timely (construction phased), internal termination of all associated wiring.
- C. Specific function control modules (SFCM):
 1. Units shall conform with the parameters outlined for programmable control modules, except that the memory shall be permanent and unaffected by loss of commercial power.
 2. Units shall be employed as designated (never as a substitute for PCM's).
- D. Master station software:
 1. Anti-recycle protection:
 - a. Designated programmable timers (0 to 120 minutes).
 2. User access:
 - a. Multiple level, password secured; recorded log "On"/log "Off".

- b. Prompted, menu driven, English language communication; contiguous, help key actuated, instruction display.
 - c. Configuration software replete.
- 3. Time-of-day scheduling:
 - a. Individually editable 8-day (7 plus holiday; 6 events per day) master schedules.
- 4. Features:
 - a. Custom control language, optimum start/stop, after hours override, run time and maintenance messages.
- 5. Operator interface:
 - a. Graphic displays:
 - 1) Subcontractor created, dynamic, time dominion relevant, point data (descriptors, values and/or symbols).
 - 2) ALPHANUMERICAL DESIGNATIONS (EQUIPMENT, CONTROLLERS, CONTROLLED DEVICES, ETC.) AND GRAPHICAL CONFIGURATIONS MATCHING BIDDING DOCUMENTS TERMINOLOGY AND SCHEMATICS; UPON REQUEST, THE ENGINEER WILL PROVIDE DIGITAL FILES.
 - 3) Operator controlled (using mouse and/or function keys in conjunction with pop-up menu windows), sequential link, multiple access, manual point override, remote panel programming access (via single keystroke).
 - 4) Alarm notification (specific, removable pop-up message windows; permanent, alarm pending message display).
 - 5) CRT blank (subject to designated duration of non-use), automatic restoration (subject to audible alarm or keyboard use).
 - 6) CURRENT DISPLAY (SUPERIMPOSED UPON PROPERLY CONFIGURED SCHEMATICS) OF ALL SPECIFIED MONITORING AND ALARMS.
 - b. User editing:
 - 1) Prompted, fill-in-the-blank format.
- 6. Trend log(s):
 - a. General:
 - 1) Capacity to address all inputs, outputs and calculated values.
 - 2) Retrievable in file format or graphical display.

b. Initial requirements:

1) Thermal demand:

- a) VRF systems.
- b) DOAS System

2) Electrical demand:

- a) VRF Systems.
- b) DOAS System.
- c) Service entrance.

3) Electrical energy consumed:

- a) VRF Systems.
- b) DOAS System.
- c) Exhaust Fans.
- d) Domestic Hot Water Generation System.
- e) Service entrance.

E. Diagnostics:

1. Basic operation:

- a. Self-testing; automatic storage; user notification via printer, audible tone and flashing display.

2. Troubleshooting guides:

- a. Symptom/diagnosis displays (for master station, PCM's and SFCM's).

F. Automatic dampers:

- 1. Low leakage type (parallel blade for mixing service and opposed blade for volume/throttling service).
- 2. 16 gauge galvanized steel roll-formed blades, 13 gauge galvanized steel roll-formed frame, zinc plated hardware, interlocking blade edges with inflatable closed cell neoprene seal, friction type spring-loaded stainless steel blade ends with zero clearance.
- 3. Spring return (unless physical limitations are incompatible).

L. Actuators:

1. Linkage, cams, stroke, timing, torque, etc. complementary with the needs of the associated controlled device.
2. Controlled device (damper, valve) position monitoring (except units serving heating and/or cooling terminals) shall be 'feedback' via their associated actuator(s).

M. Sensors:

1. General:

- a. Appropriate range.
- b. Suitable for service in accordance with the associated medium and ambient conditions.

2. Temperature:

a. General:

- 1) Resistance temperature device (RTD), thermistor.
- 2) Performance parameters:
 - a) Accuracy: $\pm 0.10\%$ FS.
 - b) Non-linearity: $\pm 0.10\%$ FS.

b. Space:

1) General:

- a) Location coordinated with other elements contributing to the function and aesthetics of the associated wall elevation.
- b) Compatible with local and remote editing:
 - (1) Set point adjustment.
 - (2) Indication.
 - (3) Time-of-day schedule override.

2) Attributes:

- a) Adjustable ($\pm 2^\circ\text{F}$).
- b) Indicating (liquid crystal display).
- c) Blank cover.

- c. Immersion/insertion:
 - 1) Well, easily removable probe.
 - 2) Weather resistant housing as required.
- 3. Humidity:
 - a. General:
 - 1) Resistance bulk polymer.
 - 2) Zero and span potentiometers.
 - b. Performance parameters:
 - 1) Accuracy: $\pm 2.0\%$ (20% rh to 95% rh).
- 4. Pressure:
 - a. General:
 - 1) Capacitance type.
 - 2) Thermal coefficient matched components, temperature compensated.
 - b. Gases:
 - 1) Stainless steel diaphragm, insulated stainless steel electrode.
 - 2) Performance parameters:
 - a) Accuracy: $\pm 1.0\%$ FS.
 - b) Non-linearity: $\pm 1.0\%$ FS.
 - c) Hysteresis: 0.10% FS.
 - d) Non-repeatability: 0.05% FS.
 - c. Liquids:
 - 1) Stainless steel components, elastomer seals.
 - 2) 3-valve manifold assembly, bleed ports.
 - 3) Performance parameters:
 - a) Accuracy: $\pm 0.25\%$ FS.
 - b) Non-linearity: $\pm 0.20\%$ FS.
 - c) Hysteresis: 0.10% FS.

d) Non-repeatability: 0.05% FS.

6. Air flowrate:

a. General:

- 1) Electronic thermal dispersion type.
- 2) Microprocessor based digital control, BMS interface.
- 3) AMCA tested, NEMA 4 enclosure.

b. Components:

- 1) Airfoil shaped, extruded aluminum probes, mounting brackets.
- 2) LCD screen.
- 3) Shielded communication cable.

c. Performance parameters:

- 1) Accuracy: $\pm 3\%$.
- 2) Repeatability: $\pm 0.25\%$.

d. Graphic translation for real time display (CFM).

7. Refrigerant:

a. General:

- 1) Single pass, infrared, non-dispersive.
- 2) 50 ft sampling tube, end filter.

b. Features:

- 1) Self diagnostic.
- 2) Programmable, multiple refrigerants.
- 3) Adjustable alarm levels.
 - a) Leak.
 - b) Spill.
 - c) Evacuation.
- 4) 4-20 milliampere output.

- 5) Indication:
 - a) Audible (horn):
 - (1) 90 DBA at 10 ft.
 - b) Visual (strobe):
 - (1) Red.
 - (2) 20 candela.
- 6) Alarm silence.
- c. Performance parameters:
 - 1) Accuracy: ± 1 ppm, $\pm 10\%$ reading.
 - 2) Sensitivity: 1 ppm.
 - 3) Range: 0-1,000 ppm.
 - 4) Operating temperature: 32F-122F.
- 8. Dissolved oxygen:
 - a. General:
 - 1) Galvanic action type, easily replaceable.
 - 2) Gold cathode, silver anode, pre-stressed bonded teflon diaphragm, potassium chloride electrolyte, self cleaning.
 - 3) NEMA 4X converter enclosure, automatic calibration.
 - 4) Liquid crystal display.
 - b. Performance parameters:
 - 1) Accuracy: $\pm 0.5\%$ FS.
- N. Water leak detection:
 - 1. Isolated dry contacts.
 - 2. Building management system compatible.
- O. Water meters:
 - 1. Sealed register, magnetic drive.
 - 2. Center sweep hand dial, leak indicator, dome glass lens.
 - 3. Impulse contactor, building management system interface compatible.

P. Gas meter:

1. Provided by public utility.
2. Impulse contactor, building management system interface compatible.

Q. Thermostat (line voltage):

1. Indicating (as shown on the drawings or herein specified), 120 volt, appropriate set point range, adjustable sensitivity (2F, minimum), adjustable heating anticipator.
2. Concealed adjustment and/or guard (as shown on the drawings), accessories necessary to accommodate the associated control sequence.
3. Final location coordinated with other elements contributing to the aesthetics of the associated wall elevation.

R. Low limit thermostats (serving hydronic and/or steam coils):

1. Appropriate set point range, 120 volt, adjustable sensitivity (2F, minimum), manual reset (remote accessibility as directed), connecting capillary tube (20 feet long, minimum).
2. Capable of responding to the lowest temperature sensed by any one foot portion.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Air supply:

1. Air supply for automatic temperature control shall be the building's existing pneumatic system.
2. All required auxiliaries (pressure reducing valves, filters, oil indication, etc.) shall be replaced.

B. Electrical wiring:

1. Wiring required to accomplish the temperature control sequences herein specified shall be the responsibility of this Contractor and installed in strict accordance with the National Electrical Code.
2. Power wiring required to energize the control systems shall be the responsibility of this Contractor and executed by the Electrical Contractor.
3. Wiring associated with DDC components shall be twisted, low voltage, shielded (as required), plenum cable.

4. Exposed wiring shall be installed in DEDICATED electrical metallic tubing with set-screw and compression type couplings and connectors for interior dry locations and interior wet locations or exterior locations, respectively.
 5. Provide conduit labels (located to ensure continuous systems recognition) and identification at wiring terminations).
- C. Automatic dampers:
1. Units which are shown on the drawings to serve as automatic mixing dampers shall be sized and arranged as shown with the blades of the automatic outside air and return air dampers (6" width, maximum) positioned to ensure impingement of their respective air streams.
- D. Identification:
1. Provide controlled variable sensors labels (temperature, pressure, hydronic flowrate, etc.) serving controlled devices (dampers and valves).
- E. REMOVE ALL EXTRANEIOUS PORTIONS OF EXISTING CONTROL SYSTEMS THAT ARE UNNECESSARY TO COMPLEMENT THE PROPOSED RETROFIT.

3.02 SEQUENCES

- A. System Control, General:
1. The fundamental objective of the control sequences is to provide system control of reasonable complexity that minimizes energy consumption while meeting the associated demands.
 2. Unless otherwise specified and/or noted, all temperatures shall be considered as dry bulb graduations.
 3. Airside economizer/return air related enthalpy preference shall be determined in context with global outside air and return air temperature and humidity sensors.
 4. Software formulated optimization relative to systems and/or systems components operation shall be manifested by appropriately developed algorithms considering pertinent variables and associated trend logs.
 5. Time-of-day scheduling shall automatically (with manual over-ride) select the system cycles (occupied, unoccupied) of operation.
 6. Included in the Electrical Contract are provisions for the installation of a relay(s) in the fire alarm control panel(s) which shall be activated in the event of an alarm; provide the switches, relays, etc. necessary to interface with the above mentioned relay(s) and shut down all fans as noted in the motor and starter schedule.
 7. The building systems may be subdivided as follows:

A. Variable Volume Rooftop Heating, Ventilating and Air Conditioning Units Control
(RTU-1, RTU-2)

1. General:

- a. The building management system via a PCM in combination with a return air temperature sensor, return air humidity sensor, return air carbon dioxide sensor and outside air temperature sensors shall enable the integral unit controls and execute the ancillary measures required to provide the sequences of operation herein described.
- b. Unit shall provide heating, ventilating and air conditioning while operating during "Occupied" and "Unoccupied" cycles of operation.
- c. Controls shall prevent the simultaneous operation of heating and airside economizer and heating and mechanical cooling.
- d. As the required flow rate of conditioned air varies and the variable volume terminals modulate accordingly, a PCM in combination with a static pressure sensor located in the system supply air ductwork, shall vary the system supply fan speed to maintain its set point (1.0 in, wg), while maintaining a minimum system airflow as scheduled.

2. Occupied cycle control:

a. Unit fans control:

- 1) Supply fan shall operate continuously.
- 2) Exhaust fan shall modulate to maintain nominal building pressurization in response to airside economizer operation and/or required occupancy ventilation.

b. Unit ventilation control:

- 1) Outside air damper shall modulate to compliment airside economizer operation admitting up to 100% outside air, but never less than the scheduled minimum.

c. Unit temperature control:

- 1) As the required capacity for heating varies, the burner(s) serving the associated heating section shall modulate to maintain the supply air set point (60F).
- 2) As the required capacity for cooling varies, the automatic outside air damper and the compressor(s) serving the associated cooling section shall modulate in sequence to maintain the supply air set point (55F), while maintaining a maximum return air relative humidity (50% rh) and modulating the control valve serving the associated hot gas reheat coil.

3. Unoccupied cycle control:

a. Unit controlled devices position:

- 1) Exhaust and outside air dampers shall maintain their normally closed position.
 - b. Unit fans control:
 - 1) Supply fan shall cycle conjunctive with heating section operation.
 - 2) Exhaust fan shall not operate.
 - c. Unit temperature control:
 - 1) As the required capacity for heating varies, the burner(s) serving the associated heating section shall modulate to maintain the lowest zone temperature set point (60F).
 - 2) Cooling section shall not operate.
4. Monitoring:
 - a. Supply fan status.
 - b. Exhaust fan status.
 - c. Heating section status.
 - d. Cooling section status.
 - e. Supply air temperature.
 - f. Return air temperature.
 - g. Outside air temperature.
 - h. Mixed air temperature.
 - i. Return air relative humidity.
 - j. Outside air damper position.
 - k. Exhaust air damper position.
 - l. Outside air flow.
 - n. Filter pressure differential.
6. Alarms:
 - a. Unit failure.
 - b. High return air temperature, occupied cycle.
 - c. Low return air temperature.

- d. High return air relative humidity.
- e. Low outside air flow.
- g. Fire alarm status.
- h. Change filters.

B. Variable Air Volume Terminals Control:

1. Occupied cycle:

a. Below changeover:

1) Controlled devices position:

- a) The normally open terminal damper shall maintain its scheduled maximum airflow.

2) Temperature control:

- a) As the required capacity for heating varies, a SFCM in combination with a space temperature sensor shall Modulate the normally open control valve serving the associated reheat coil to maintain its set point (72F).

b. Above changeover (mechanical cooling):

- 1) As the required capacity for heating and cooling varies, a SFCM in combination with a space temperature and zone airflow sensors shall initiate the following in sequence, on a **FALL** in space temperature, to maintain its set point (75F):

- a) Modulate the normally open terminal damper (by resetting the zone air flow rate in accordance with the prevailing space temperature) to its low limit set point.
- b) Modulate the electric heating element solid state power controller.

2. Unoccupied cycle:

a. Controlled devices position:

- 1) The normally open terminal damper shall maintain its scheduled maximum airflow.

b. Temperature control:

- 1) As the required capacity for heating varies, an SFCM in combination with a space temperature sensor shall Modulate the normally open control valve serving the associated reheat coil to maintain its set point (60F).

3. Monitoring:

- a. Space temperature.
- b. Discharge air temperature.
- c. Air flowrate.
- d. Damper position.
- e. Reheat coil valve position.

4. Alarms:

- a. Low space temperature.
- b. High space temperature, occupied cycle.

C. Isolated naturally convective radiation control:

1. Temperature control:

- a. As the required capacity for space heating varies, a SFCM in combination with a space temperature sensor shall cycle the electric heating element to maintain its set point (72F).

2. Monitoring:

- a. Unit Status (Off / On).
- b. Space temperature.

D. Toilet Room Exhaust Fan Control:

1. General:

- a. The building management system via a PCM in combination with occupancy sensors shall and execute operations herein described.

1) Occupied Cycle Control:

Whenever an occupancy sensor in any space served by the fan is activated, the normally closed outside air damper shall open, and the fan shall be energized for a programmed duration.

2) Unoccupied Cycle Control:

The normally closed outside air damper shall maintain it's fully closed position. The fan shall not operate.

2. Monitoring:

A. Damper Position

B. Cycle of Operation (Unoccupied / Occupied)

C. Fan Status

3. Alarms:

A. Fan Failure

E. Variable Refrigerant Flow Systems:

1. General:

- a. System shall be controlled via their integral controls as described in Specification Section 235284, Variable Refrigerant Flow Systems. Building Management System shall provide monitoring and alarms as follows:

2. Monitoring:

- a. Fan coil units:
 - 1) Fan 'On'/'Off'.
 - 2) Heating/Cooling.
 - 3) Space temperature.
 - 4) Supply air temperature.
- b. Branch selector boxes.
 - 1) Heating/cooling.
 - 2) Refrigerant suction pressure.
 - 3) Refrigerant hot gas pressure.
- c. Air cooled condensing units:
 - 1) Compressor speed.
 - 2) Refrigerant suction pressure.
 - 3) Refrigerant hot gas pressure.
 - 4) Entering air temperature.
 - 5) Leaving air temperature.

3. Alarms:

a. Fan coil units:

- 1) Unit failure.
- 2) Low space temperature.
- 3) High space temperature (occupied cycle).
- 4) Change filter.

b. Air cooled condensing units:

- 1) Unit failure.
- 2) Low refrigerant suction pressure.
- 3) High refrigerant hot gas pressure.
- 4) Low leaving air temperature.
- 5) High leaving air temperature.

F. Dedicated Outdoor Air Systems (DOAS-1)

1. General:

- a. System shall provide exhaust energy recovery and tempered ventilation on a time of day schedule.

2. Monitoring:

- a. Supply air discharge Temperature.
- b. Outdoor Air Temperature..
- c. Return Air Temperature.
- d. Exhaust Air Temperature.
- e. Supply Air Flow Rate.

3. Alarms:

- A. Low Supply Air Temperature.
- B. Change Filters.

SECTION 23 55 80

AIR SYSTEMS TESTING AND BALANCING

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Provide a complete program of air systems and hydronic systems testing and balancing (including adjustments to existing systems as shown and/or noted) in accordance with the drawings and as herein specified, which shall permit achieving design objectives.
- B. Upon completion of the HVAC system, this Contractor, in order to accomplish the above, shall:
 - 1. Operate the HVAC system as required for testing and balancing.
 - 2. Secure the services of an independent testing and balancing agency (approved by the Engineer) which specializes in testing and balancing HVAC systems.
 - 3. Assist the testing and balancing agency as required relative to completing the *preliminary procedure* herein described.
- C. Testing and balancing shall complement the needs of PHASED CONSTRUCTION, including rebalancing when systems are completed.
- D. Testing and balancing, if requested, shall be conducted in the presence of the Engineer and/or the Owner's authorized representative.
- E. Instruments used for testing and balancing shall be accurately calibrated and in good working order.

1.02 PROPOSAL

- A. A complete proposal, to be submitted to the Engineer for review, shall include the following:
 - 1. The name of the testing and balancing agency.
 - 2. A complete outline of the proposed testing and balancing methods and procedures; configured to provide technicians with explicit, pertinent direction.
 - 3. A warranty period of one year (after completion of testing and balancing), during which time the Engineer, at his discretion, may request a recheck or readjustment of any system component or perform testing of his conception (assisted by technicians employed and compensated by the testing and balancing agency) as required.

4. A SIGNED AFFIDAVIT (attached) attesting to strict compliance with the procedures hereinafter described.

1.03 REPORT

- A. Upon completion of testing and balancing, a complete report shall be submitted to the Engineer for review. All data and calculations shall be neatly typewritten and presented in accordance with the methods and procedures herein specified.

PART 2 – PRODUCTS

2.01 ACCEPTABLE TESTING AND BALANCING AGENCIES

- A. Energy Balance, Mechanical Testing, Inc., New York Technologies or approved equal.

PART 3 – EXECUTION

3.01 TEST AND BALANCE AIR SYSTEMS IN ACCORDANCE WITH THE FOLLOWING:

- A. Preliminary procedure (HVAC contractor and testing and balancing agency):
 1. Thoroughly review drawings and specifications to determine design objectives.
 2. Verify variations in actual installation from the drawings and specifications with sheet metal foreman.
 3. Check filters, dampers and temperature control components for completeness of installation and correct position.
 4. Obtain the terminal unit manufacturer's outlet factors and recommended procedures for determining airflow.
 5. Prepare schematic diagrams to facilitate reporting as required or as requested by the Engineer.
 6. Verify dampers (volume, fire and smoke) are in their full-open position.
 7. Correct airflow rate measurements for temperature and barometric pressure when the compound error exceeds 10%.
 8. Verify filter media has been replaced as required to ensure appropriate resistance.
- B. Equipment and distribution systems testing and balancing:
 1. General:
 - a. With all fans in operation, immediately check rotation and motor amperage (to guard against possible overload).

- b. Adjust fan speed to compensate for normal duct leakage and additional static pressure imposed by balancing requirements as required.
 - c. Whenever possible, flowrate measurements at terminal units shall be obtained by using calibrated airflow measuring cones.
 - d. Adjust terminal outlets to obtain proper distribution patterns.
 - e. Make final adjustments as required after the building is occupied.
2. Constant Volume Systems:
- a. Drill traversing holes at appropriate points in ductwork at AHU's (EA, OA, RA, SA).
 - b. Traverse unit to establish baseline, then manipulate AHU drives and dampers position to achieve scheduled CFM at minimum OA.
 - c. Adjust manual volume dampers in main trunk and branch trunk ducts proceeding in a downstream direction to obtain the proper flowrate.
 - d. Adjust terminal units proceeding in a downstream direction using manual volume dampers in branch ducts for major adjustment and terminal unit dampers for minor adjustment only. Provide additional dampers in branch ductwork as required to prevent objectionable noise caused by terminal unit dampers.
 - e. Total the tested terminal unit flowrate and compare with required total system flowrate to determine ductwork leakage.
3. Variable Air Volume Systems:
- a. Drill traversing holes at appropriate points in ductwork at AHU's (EA, OA, RA, SA).
 - b. Place VAV dampers in their wide-open position.
 - c. Traverse unit to establish baseline, then manipulate AHU drives and dampers position to achieve scheduled block load CFM at minimum OA.
 - d. Begin calibrating VAV flow sensors to their maximum CFM, progressing from smallest to largest VAV.
 - e. Begin placing calibrated VAV's to their minimum flow CFM; thereby forcing air to VAV's with greater maximum flow CFM, continuing until additional VAV's can not attain maximum flow CFM.
 - f. Increase the ductwork SP to produce the scheduled, established block load CFM while checking SP at AHU to avoid exceeding ductwork limit.
 - g. Continue this iteration until all VAV air sensors are calibrated for maximum flow CFM.

- h. Release VAV's to predetermined ductwork SP, permitting them to operate diversely within equipment and ductwork limits.
- C. Record the following data as applicable for each system component and incorporate in the complete report for submittal:
 - 1. Fan DESIGN conditions, including location, area served, type, flowrate, static pressure, discharge static pressure, outlet velocity, motor BHP and motor HP.
 - 2. INSTALLED fan description, including manufacturer, model number, size, class, belt number and size, drive and driven sheave size, belt position on adjustable sheaves, motor nameplate HP and motor nameplate current characteristics.
 - 3. MEASURED fan conditions, including flowrate, speed, static pressure, discharge static pressure, outlet velocity, calculated BHP (based on average current readings of all legs at motor terminals) and motor speed.
 - 4. Terminal unit DESIGN conditions, including location, area served, type, pattern, flowrate, throw, static pressure drop and NC rating.
 - 5. INSTALLED terminal unit description, including manufacturer model number, size (neck area for diffusers and core area for grilles), outlet factor (based upon manufacturer's data when available or calculated based on field testing when necessary) and pattern.
 - 6. MEASURED terminal unit conditions, including test velocity and flowrate.
 - 7. Duct DESIGN conditions at points of traverse, including location, area served, size, velocity and flowrate.
 - 8. MEASURED duct conditions at points of traverse, including average velocity and flowrate.
 - 9. Differential pressure between the building interior and exterior at operating conditions of minimum and maximum outside air.
 - 10. All significant variations of the actual installation from the drawings and specifications.

3.03 BALANCING DEVICE SET POINT INDICATION

- A. Clearly mark (in permanent, easily visible fashion) each balancing device (dampers and flow meters) set point at the conclusion of the entire HVAC system balancing.

END OF SECTION

HVAC TESTING AND BALANCING PROCEDURES

A. Procedures will be in accordance with those set forth in specification section 23 55 80, Part 3 - Execution.

B. _____
TESTING AND BALANCING AGENCY:

BY:

DATE:

SECTION 23 55 90

GAUGES, THERMOMETERS AND TEMPORARY PRESSURE/TEMPERATURE WELLS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install gauges, thermometers and temporary pressure/temperature wells in accordance with the locations shown on the drawings.
- B. Units shall operate within the middle third of a range selected to suit the measured medium under normal operating conditions.
- C. Units measuring mediums subject to quickly changing pressures shall be complete with dampening device at the inlet.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Gauges and thermometers:
 - 1. Taylor, Trerice, Weiss, Winters or approved equal.
- B. Temporary pressure/temperature wells:
 - 1. Pete's Plug or approved equal.

2.02 DESCRIPTION

- A. Pressure gauges:
 - 1. Phosphor bronze internals, $\pm 1\%$ accuracy.
 - 2. White face, black embossed figures, adjustable black pointer, safety glass window.
 - 3. 1/4 inch NPT bottom inlet, gauge cock, over/under stop, snubber.
- B. Thermometers:
 - 1. Dial:
 - a. Adjustable, bi-metal, $\pm 1\%$ accuracy.
 - b. White face, black embossed figures, adjustable black pointer, safety glass window.

- c. 1/2 inch NPT connection, back inlet, stem, Thermowell (33% pipe penetration), braided remote reading capillary as required.
- C. Temporary pressure/temperature well:
 - 1. Brass body and cap with retaining strap.
 - 2. 1/4 inch Nordel or neoprene core; 45F to 275F, 400 psig.
 - 3. Spare gauges (2) and thermometers (4).

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Unit locations shown on the drawings are indicative of the approximate point where measurement is required.
- B. Actual locations must permit easily accessible reading and prevent error due to the relative location of other system components (e.g., pressure gauges shall be located 5 pipe diameters downstream from fittings and valves; avoid locating thermometers where nearby mediums of temperatures, other than that being measured, may affect reading, etc.).
- C. Install gauges and thermometers after construction is substantially complete; thereafter calibrate, clean and adjust viewing angle.
- D. Temporary pressure/temperature well probes shall be carefully inserted and promptly removed.

END OF SECTION

SECTION 23 55 91

IDENTIFICATION

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install identification for equipment, ductwork, piping and valves.
- B. Identification shall include labels, stenciling, concealed location indicators and warning tape.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Brady, Seton or approved equal.

2.02 DESCRIPTION

- A. Labels:
 - 1. Equipment:
 - a. Standard, phenolic, engraved nameplates.
 - b. Appropriately sized lettering:
 - 1) Large equipment:
 - a) 3/4 inch high by 1/2 inch.
 - 2) Small equipment:
 - a) 3/8 inch high by 1/4 inch.
 - 2. Ductwork (concealed and exposed outside finished spaces):
 - a. Neatly stenciled (with appropriately sized lettering), 50 foot intervals (15 foot intervals within equipment rooms).
 - 3. Piping:
 - a. General:
 - 1) Concealed and exposed outside equipment rooms:
 - a) 25 foot intervals.
 - 2) Equipment rooms:

- a) 15 foot intervals.
 - b) Near equipment connections.
 - b. 2 inches and smaller:
 - 1) Semi-rigid plastic with pre-set curl (designed to "snap-on" with substantial overlap), sized and color-coded in accordance with ANSI Standard A 13.1, complete with pipe size and directional flow arrows.
 - c. 2 ½ inches and larger:
 - 1) Neatly stenciled (with appropriately sized lettering indicating pipe size, and directional flow arrows).
- B. Concealed location indicators:
- 1. Equipment:
 - a. 1/4 inch text (appropriate alphanumerical designation) secured to suspended ceiling system grid or respective access door (Kroy or equal).
 - b. Positioned to indicate filter access.
 - c. Variable air volume terminals, mixing box terminals, terminal reheat coils, water to air heat pumps.
 - 2. Valves:
 - a. 1/2 inch diameter, pressure-sensitive adhesive spot markers.
 - b. Color coded:
 - 1) Steam and steam condensate (ORANGE).
 - 2) Heating hot water (PURPLE).
 - 3) Chilled water (GREEN).
 - 4) Domestic hot water (RED).
 - 5) Domestic cold water (BLUE).
- C. Warning tape (underground utilities):
- 1. 3.5 mils thick, 6 inch wide, appropriate APWA color code, heavy duty polyethylene.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Equipment labels (using the precise alphanumerical designation shown on the drawings) shall be securely mounted (in a conspicuous position) with appropriate fasteners and shall be applied to ALL equipment.
- B. Piping and ductwork labels/stencils shall be located to ensure continuous systems identity; visible from below or side for concealed systems and exposed systems outside finished spaces, from top for exposed systems within finished spaces.
- C. Valve location indicators shall be adhered to suspended ceiling system grids and/or access doors at all main, branch main and branch piping valve locations.

END OF SECTION

SECTION 26 60 10

GENERAL PROVISIONS

PART 1 – GENERAL

1.01 RELATED PORTIONS OF THE SPECIFICATION

- A. Work in this division shall be subject to the applicable portions of the bidding documents.

1.02 SCOPE OF WORK

- A. Furnish and install equipment and materials required to provide complete electrical system alterations.

1.03 REQUIREMENTS

- A. Systems shall conform with the applicable portions of American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE), Insulated Power Cable Engineers Association (IPCEA), National Electrical Manufacturer's Association (NEMA), International Electrical Testing Association (INETA) and the associated utility company standards.
- B. Systems shall conform with the applicable portions of the requirements set forth in the National Electrical Code (NFPA-70 2023 Edition).
- C. Components and/or systems tested by Underwriters Laboratories, or other suitable nationally recognized independent testing laboratories, shall bear the associated label, seal or stamp of conformance.

1.04 MANUFACTURER'S SAFETY DATA SHEETS (MSDS)

- A. Provide a bound, indexed assembly of pertinent equipment and materials (including applicable subcontractor items).

1.05 CONNECTIONS TO UTILITIES

- A. Furnish and install feeders interfacing with public and/or site utilities in accordance with the sizes and locations shown on the drawings IN STRICT COMPLIANCE WITH THE RULES AND REGULATIONS SET FORTH BY THE AUTHORITY HAVING JURISDICTION, complete with tests, final connections and appurtenances as required.
- B. Connections causing interruption of service shall be performed "off-hours", employing "premium time" labor rates as applicable.
- C. The Owner will pay all related public utility charges.

1.06 CONNECTIONS TO EQUIPMENT THAT IS EXISTING AND/OR FURNISHED BY OTHERS

- A. Furnish and install branch circuits serving equipment that is existing and/or furnished by others in accordance with the sizes and locations shown on the drawings, complete with final connections, including provisions for disconnects and receptacles as required.

1.07 FABRICATION DRAWINGS, MATERIAL LISTS AND EQUIPMENT SUBMITTALS

- A. Prior to installation, submit fabrication drawings, material lists and equipment submittals (shop drawings) and short circuit/coordination summary for approval in accordance with the following:
 - 1. It is the intent of these specifications to define the requirements for fabrication drawings, material lists and equipment submittals. Questions regarding these requirements shall be directed to the Engineer prior to submission.
 - 2. Fabrication drawings and material lists shall conform with the requirements herein specified.
 - 3. Equipment submittals, unless otherwise specified, shall conform to the following:
 - a. Submittals shall be complete with the manufacturer's product description literature. SUBMITTALS WITH INSUFFICIENT LITERATURE WILL BE DISAPPROVED.
 - b. Submittals shall include a complete listing associated parameters contained in the bidding documents (materials, finishes, capacities, electrical characteristics, etc.). THE ENGINEER WILL NOT TRANSFER INFORMATION FROM THE BIDDING DOCUMENTS TO THE SUBMITTALS. INCOMPLETE SUBMITTALS WILL BE DISAPPROVED.
 - c. Submittals shall be clearly marked to differentiate between the applicable and extraneous portions. THE ENGINEER WILL NOT MARK THE SUBMITTALS. UNMARKED SUBMITTALS WILL BE DISAPPROVED.
 - d. The attached Submittal Cover Sheet will be copied, filled out and attached to each item submitted.
 - 4. SUBMITTALS (INCLUDING RE-SUBMISSIONS), PREPARED AND TRANSMITTED IN ELECTRONIC FORMAT, SHALL BE ACCOMPANIED WITH A HARD COPY COMPRISED OF ORIGINAL, PRINTED PRODUCT LITERATURE (PHOTOCOPIES ARE NOT ACCEPTABLE).
 - 5. ADDITIONALLY, ELECTRONIC SUBMITTALS WHICH DO NOT CONFORM WITH THE ABOVE REQUIREMENTS WILL NOT BE REVIEWED, BUT RATHER DELETED WITH A CORRESPONDING TRANSMISSION: "REJECTED, NON-COMPLIANT SUBMISSION!"
 - 6. Unless otherwise noted or herein specified, the following is required:
 - a. Material lists:
 - 1) Wire and conduit.

- 2) Supporting systems.
 - 3) Overcurrent protection devices.
 - 4) Fuses.
 - 5) Grounding systems components.
 - 6) Identification.
- b. Equipment submittals:
- 1) Receptacles and switches.
 - 2) Luminaires.
 - 3) Wireless lighting systems controls.
 - 4) Switchboards/panelboards.
 - 5) Disconnects/safety switches.
 - 6) Addressable fire alarm and detection systems.
 - 7) Emergency lighting systems.
 - 8) Exit lights.
 - 9) Security systems.
 - 10) Electric cord reels.
 - 11) Telecommunications systems.
 - 12) Communications cabinets, racks, frames and enclosures.
 - 13) Communications terminal blocks, patch panels and patch cords/jumpers.
 - 14) Communications cable management.
 - 28) Grounding and bonding for communications systems.
 - 29) Communications cable-copper.
 - 30) Communications cable-fiber optic.
 - 31) Strut mount continuous cable support system.
- d. Short circuit and coordination summary:
- 1) Tabulate distribution interrupting rating/overcurrent protection relationships.

- 2) Record appropriate adjustable trip settings.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Materials and equipment shall be in strict accordance with the parameters herein specified.
- B. Material and/or equipment of the same category (e.g.: service entrance equipment, panelboards, load centers, circuit breakers, receptacles, switches, etc.) shall be of the same manufacturer; special systems which are a composite of several manufacturer's components (e.g., fire alarm, security alarm, communication) shall be supplied and serviced by a single source of responsibility.

2.02 ACCESSORIES AND COMPONENTS

- A. It is the intent of this specification that systems and equipment shall be complete with the necessary quantity of accessories and components required to insure a properly functioning installation.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Work shall be expeditiously executed in a well-planned, organized, neat, workmanship like manner.
- B. Unless otherwise noted or herein specified, materials and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. Electrical work herein specified and/or noted shall be executed in strict conformance with the National Electrical Code.
- D. Work shall be executed by tradesmen licensed as requires by the authority having jurisdiction.

3.02 REMOVALS

- A. Unless otherwise noted or herein specified, equipment and materials shown and/or specified to be removed (including related accessories and appurtenances) shall become the Contractor's property and shall not be permitted to accumulate but shall be promptly removed from the job site.
- B. The disposal of components containing asbestos and/or polychlorinate biphenyls (PCB's) shall be in strict conformance with governing federal, state and local regulations.
- C. Work shall be carefully executed to prevent the disruption of, or damage to, new work or existing work which is to remain.

3.03 CEILING PLENUM SPACE COORDINATION

- A. Unless otherwise shown and/or noted, mechanical/electrical distribution systems shall generally be arranged in the following descending order:
 - 1. Branch sprinkler piping and feeder conduits (highest).
 - 2. Ductwork.
 - 3. HVAC hydronic piping and plumbing piping (lowest).
- B. Branch circuit conduits shall be accommodating as required.

3.04 PROTECTION

- A. Materials, equipment and accessories shall be suitably covered and protected during construction.
- B. Materials, equipment and accessories damaged during construction shall be replaced at no cost to the Owner.

3.05 SUPPORTS

- A. Provide auxiliary steel (beams, channels, angles, formed shapes, etc.) required to properly support equipment and distribution systems.
- B. Utilize galvanized components (wherever practical) or field apply 2 coats of corrosion resistant primer.
- C. Seismic anchorages, restraints and equipment supports shall comply with National Uniform Seismic Installation Guidelines.

3.06 FINAL CLEANING, ELECTRICAL ROOMS

- A. Remove trash and debris.
- B. Thoroughly sweep (using sweeping compound) and subsequently vacuum floors.
- C. Hand wash wall surfaces and equipment and remove any foreign substance (adhesive, extraneous paint, droppings, etc.).
- D. Damp-mop floors.

3.07 RECORD DRAWINGS

- A. Promptly record (in a neat, legible and red-color-only accentuated fashion, on a complete, designated set of bidding documents containing no other markings) significant differences reflected by the actual installation (sizes, capacities, locations and features of distribution systems and equipment).
- B. Additionally, prepare appropriately scaled drawings showing conduit locations below grade and within concrete slabs.

3.08 OPERATION AND MAINTENANCE MANUAL

- A. Near the completion of work, submit three bound, neatly arranged, indexed Operation and Maintenance Manuals for approval.

- B. Manuals shall be contained in heavy duty, 3-ring vinyl covered loose-leaf binders (suitable sets of MANAGEABLE SIZE, like equipment and systems grouped) complete with:
1. Typewritten description of contents within a clear plastic sleeve on the spine.
 2. Dividers with labeled, celluloid covered tabs.
 3. Protective plastic jacket enclosures for diagnostic software.
- C. Manuals shall contain:
1. Title page delineating:
 - a. Name of project.
 - b. General nature of contents.
 - c. Name and address of Contractor and Engineer.
 - d. Applicable cross-references to related volumes.
 2. Table of contents listing equipment (including the associated alphanumerical designation) and the corresponding section (tab).
 3. Pertinent equipment information, including:
 - a. Manufacturer and serial number.
 - b. Approved submittal.
 - c. Operating and maintenance instructions.
 - d. Names, addresses and telephone numbers relative to parts and service.
 4. Distribution summaries for switchgear, switchboards, motor control centers and panelboards.
 5. Closeout documentation: (EDIT)
 - a. Waiver of liens.
 - b. Electrical inspection certificate.
 - c. Pertinent equipment warranties.
 - e. Fire alarm system test report and device addresses.
 - f. Record drawings.

3.09 INSPECTION

- A. Obtain New York Board of Fire Underwriters (NYBFU) or Independent Electrical Inspection Agency (IEIA) inspection certificate and deliver to the Engineer.

3.10 PERFORMANCE

- A. Disconnect switches:
 - 1. Furnish and install disconnect switches in strict accordance with National Electrical Code.
- B. Circuit Numbers:
 - 1. Circuit numbers shown on the drawings are for reference only and may not be the same as the final connections.
 - 2. Rearrangement of connections may be made to suit the convenience of the Owner, Contractor or Material Supplier.
 - 3. Fixtures, devices or equipment shown to be on a common circuit may not be rearranged to other circuits without permission from the Engineer.
 - 4. Circuit numbers or connections changed from those shown on the drawings shall be so noted on the "Project Record Documents" (as-built drawings).
 - 5. Circuits and numbers actually used shall be entered in the directory of the associated panelboard.

3.11 POWER DISTRIBUTION SYSTEM CHECK OUT

- A. Subsequent to testing, concurrently energize related branch circuit loads on a feeder-by-feeder basis and correct associated phase imbalance.

3.12 PUNCH LIST

- A. When the Engineer is directed or requested to prepare a summary of incomplete work, the Contractor's Project Manager and Foreman shall visit the job site with the Engineer's Representative(s).
- B. Thereafter, the Contractor's Project Manager shall direct his Foreman and subcontractors to complete observed incomplete work.
- C. Finally, the Contractor's Project Manager and Forman shall visit the job site with engineer's representative(s) to determine any remaining incomplete work.
- D. As required, items B. and C. shall be repeated until work is properly completed.

3.13 SYSTEMS DEMONSTRATION

- A. Subsequent to completing the electrical systems, the Electrical Contractor in conjunction with the Engineer shall orchestrate a demonstration of the applicable systems (commercial power, standby power, uninterruptible power, lighting, fire alarm, security, communication, etc.) in accordance with the parameters herein specified.
- B. In addition to the Engineer's representative(s), the following parties shall participate:
 - 1. The Electrical Contractor's project manager and job site foreman.
 - 2. The electrical equipment and/or principal subsystem supplier's service technicians, as requested by the Engineer.

3.14 INSTRUCTION

- A. Provide thorough, organized instruction regarding equipment and systems operation to the Owner's authorized representatives (secure written acknowledgement and forward to the Engineer).

END OF SECTION

SECTION 26 60 30

TESTS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Test each completed portion of the wiring system before it is energized. (Do not test outdoor grounding systems within 48 hours of rainfall).
- B. Provide all required test equipment and energy.

1.02 REPORTS

- A. Complete reports of all high voltage and grounding tests shall be submitted in duplicate by the Contractor to the Engineer, indicating the date, weather conditions, persons present, instruments used, hook-up and location diagrams as necessary, test results, corrective actions taken if applicable, and results of retesting if applicable.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 WIRING SYSTEMS – 600 VOLTS OR LESS

- A. Test all conductors for opens, shorts and grounds.

3.02 GROUNDING SYSTEMS

- A. Check conduit systems for “grounds” at convenient points such as outlets located near plumbing systems or building structural steel.
- B. Test all ground rods for grounding resistance before grounding conductors are connected.
- C. Buried grounding conductors or loops shall be connected to the ground rods and tested as a system.
- D. Test the “service ground” point for ground resistance.
- E. Demonstrate that derived grounds at transformer secondaries are “grounded”.
- F. Check system neutrals and equipment grounding conductors separately for opens, shorts and unintentional grounds before interconnection to the grounding system.

END OF SECTION

SECTION 26 60 40

OVERCURRENT PROTECTIVE DEVICE AND COORDINATION STUDY

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Provide an engineering analysis and coordination study for the entire electrical distribution system. The analysis shall include a short-circuit with protective device evaluation, a protective device coordination study and arc flash calculations.
- B. The study shall begin at the point of utility service for the facility and continue down thru the electrical distribution system to all downstream distribution and branch circuit panelboards, motor control centers and significant motor loads.
- C. The analysis shall include any generators and any associated emergency power distribution equipment, including automatic transfer switches and generator ground fault protection.
- D. Shop drawings for equipment effected by the coordination study will not be reviewed until the coordination study has been submitted and approved.

1.02 RELATED DOCUMENTS

- A. One line power diagrams.
- B. Specifications.

1.03 STUDY REQUIREMENTS

- A. The study shall be in accordance with IEEE and NFPA standards.
- B. The study shall include one line power diagram, short-circuit and ground fault analysis, protective coordination plots for all overcurrent protective devices, and arc flash calculations and analysis.

1.04 QUALITY ASSURANCE

- A. The firm executing the study shall have at a minimum a four-year record of successful in-service performance for systems similar to this project.
- B. Short-circuit analysis and coordination study shall be performed by a registered Professional Engineer in the state that the project is located in.

PART 2 – PRODUCTS

2.01 SHORT-CIRCUIT ANALYSIS WITH PROTECTIVE DEVICE COORDINATION

- A. Systematically calculate fault currents based upon the available fault current at the facility service entrance, obtain available fault current from the local utility.
- B. The study shall be prepared using computer software utilizing a commercially available software package. Results of short-circuit calculations shall be presented in tabular form and shall include momentary and interrupting fault values for three-phase and phase-to-ground faults.
- C. Calculate the fault impedance to determine the available short-circuit and ground fault currents at each bus. Incorporate applicable motor and/or generator contribution in determining the momentary and interrupting ratings of the overcurrent protective devices.
- D. Analyze the short-circuit currents by preparing a tabulation comparing the fault levels to the device interrupting ratings. The following information shall be included:
 - a. Bus identification number.
 - b. Location identification.
 - c. Voltage.
 - d. Manufacture and type of equipment.
 - e. Device rating.
 - f. Calculated short-circuit current.

2.02 PROTECTIVE DEVICE COORDINATION STUDY

- A. Prepare coordination time-current characteristic curves to determine the required settings/sizes of the protective devices to maximize selectivity. The utility upstream protective device feeding the facility shall be maintained as the upper limit for coordination. These settings shall be obtained by the preparer, along with any other protective device setting requirements. The coordination curves shall be prepared on log-log paper and illustrate adequate clearing times between series devices. The curves shall be created thru the use of the study software but must reflect actual protective devices to be installed. Adequate time-current curves shall be generated to depict coordination. In addition, protective device characteristics shall be suitably determined to reflect calculated short-circuit levels at the location.
- B. A narrative analysis shall accompany each coordination curve sheet and describe the coordination and protection in explicit detail. All curve sheets shall be multi-color for improved clarity. Areas lacking complete coordination shall be highlighted and reasons provided for the coordination issues. System coordination, recommended ratings, and settings of protective devices shall be accomplished by a registered professional electrical engineer.
- C. The following information shall be provided on all curve sheets:
 - a. Device identification and associated settings/size.
 - b. Voltage at which curves are plotted.

- c. Current multiplier.
- d. ANSI frequent fault damage curve.
- e. Cable insulation damage curves.
- f. Transformer inrush point.
- g. One line power diagram for the system.
- h. Motor starting profiles.

2.03 ARC FLASH CALCULATIONS AND ANALYSIS

- A. An arc flash analysis shall be performed in conjunction with a short circuit study. Calculations shall be based upon actual over-current protective device clearing time. Maximum clearing time shall be in accordance with IEEE 1584. Analysis shall be based upon the lowest clearing time setting of the overcurrent protective device to minimize the incident energy level without compromising selective coordination.
- B. The results from the short circuit study shall be used to determine arc energy levels at each defined location in the facility for a specified working distance. Based on the arc energy at each defined point, the proper PPE level will be determined.
- C. Labels shall be provided for each evaluated location that lists the hazard levels along with the required PPE level while working in that area.
- D. Analysis shall be provided to determine if any changes can be made in protection system to reduce arc energy levels.

2.04 ONE LINE POWER DIAGRAM

- A. Show all electrical equipment and wiring to be protected by the overcurrent devices.
- B. Show the following specific information:
 - a. Calculated fault impedance, X/R ratios, and short-circuit values at each feeder and branch circuit bus.
 - b. Switchgear, switchboards, panelboards, motor control centers, relay, circuit breaker, fuses automatic transfer switches and switches continuous current ratings.
 - c. Generator kw/kVA and transformer kVA and voltage ratings, percent impedance, X/R ratios, and wiring connections.
 - d. Voltage at each bus.
 - e. Identification of each bus, matching the identification on the drawings.
 - f. Conduit, conductor, and busway material, size, length, and X/R ratios.

PART 3 – EXECUTION

3.01 SUMMARY

- A. The results of the system studies shall be summarized in a final report and submitted to the design engineer.

3.02 FIELD SETTINGS

- A. Provide field adjustments of all protective devices in accordance with the approved short circuit study and protective device evaluation/coordination study.

END OF SECTION

SECTION 26 61 11

CONDUIT SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install conduit systems in accordance with the parameters shown on the drawings and herein specified.
- B. Systems components shall be Underwriters Laboratories listed.

1.02 MATERIAL LISTS

- A. Prior to installation, submit a list of materials to the Engineer for approval which shall conform with the following:
 - 1. Each conduit system (including conduit material, fittings, connectors, bushings, etc.) shall be listed separately.
 - 2. Listings of conduit material and fittings shall be complete with a description of parameters contained in the Contract Documents (schedule number, material, standards, etc.). THE ENGINEER WILL NOT TRANSFER INFORMATION FROM THE CONTRACT DOCUMENTS TO THE LISTINGS. INCOMPLETE LISTINGS WILL BE DISAPPROVED.

PART 2 – PRODUCTS

2.01 DESCRIPTION

- A. Rigid metal conduit (RSC):
 - 1. Steel:
 - a. Conduit material:
 - 1) Galvanized (after threading), chromated (subsequent to galvanizing), high strength steel conforming to ANSI Standard C80.1.
 - 2) Corrosion resistant lubricating interior finish, color-coded end-cap thread protectors.
 - b. Fittings:
 - 1) Couplings:
 - a) Threaded (where practical).
 - b) Threadless, malleable iron or steel, compression type (as required).

2) Connectors:

- a) Insulated, threadless, malleable iron or steel, compression type (as required).

c. Bushings:

- 1) Insulated, malleable iron, grounding type.

d. Acceptable manufacturers:

- 1) Wheatland, Triangle, LTV Copperweld, Allied Tube or approved equal.

B. Electrical metallic tubing (EMT):

1. Steel:

a. Conduit material:

- 1) Galvanized, chromated and lacquered (subsequent to galvanizing), high grade mild steel conforming to ANSI Standard C80.3.
- 2) Corrosion resistant lubricated interior finish.

b. Fittings:

1) Couplings:

- a) Steel, as noted, compression type (damp interior application).
- b) Steel, as noted, set screw type (dry interior application).

2) Connectors:

- a) Insulated, steel, as noted, compression type (damp interior location).
- b) Insulated, steel, as noted, set screw type (dry interior application).

c. Acceptable manufacturers:

- 1) LTV Copperweld, Triangle, Wheatland or approved equal.

C. Liquidtight flexible metal conduit (LTFMC):

1. Conduit material:

- a) Galvanized, heavy gauge strip steel, integral continuous copper ground, extruded polyvinyl jacket conforming with the National Electrical Code, Article 351.

2. Fittings:

- a. Insulated, malleable iron or steel, liquidtight type.
- 3. Acceptable manufacturers:
 - a. Oz/Gedney, Anaconda or approved equal.
- D. Rigid non-metallic conduit (RNMCM):
 - 1. Conduit material:
 - a. Schedule 80 (unless otherwise noted), polyvinyl chloride (PVC).
 - 2. Fittings:
 - a. Molded polyvinyl chloride (PVC).
 - 3. Acceptable manufacturers:
 - a. Carlon, Cantex, National Pipe and Plastics or approved equal.
- E. Metal-Clad cable (MC):
 - 1. Conduit material:
 - a. Galvanized, steel armor, integral continuous copper ground, conforming with the National Electrical Code, Article 330.
 - 2. Fittings:
 - a. Insulated, steel, speed-lock type.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Refer to Conduit Systems Application note under general notes on contract drawings for conduit installation requirements.
 - 2. Metal conduit systems shall assure electrical continuity (low impedance pathway to ground).
 - 3. Provide suitable fittings to properly compensate for expansion and deflection at building control and expansion joints.
 - 4. Conduit shall be 1/2 inch (minimum, unless otherwise noted), except those below grade or within concrete slabs which shall be 3/4 inch (minimum); additionally, conduits for multiple branch circuits shall be 3/4 inch (maximum).
 - 5. Plug or cap open ends and provide polypropylene pull cord in empty (spare) conduits.

6. Conduit systems shall not be permitted in concrete slabs unless specifically noted on the drawings; whereupon, it shall be installed as detailed.

B. Above grade:

1. Furnish and install conduit systems above grade (which are not in concrete slabs) substantially as shown on the drawings, as high as possible, parallel to building walls, clear of structural members (except when penetrations are shown or approved), positioned 12 inches (minimum) from hot surfaces (hot water and steam distribution systems, radiant heat transfer surfaces, convective heat transfer surface enclosures, etc.) and clear of equipment removal and service areas.
2. Unless otherwise noted, conduit systems shall be concealed in finished areas and exposed in unfinished areas.
3. Flexible metal conduit and liquidtight flexible metal conduit systems shall be bonded (at each end) to their associated equipment grounding conductors.
4. Units penetrating walls or partitions above grade (not constructed of masonry nor fire or smoke rated) shall be neatly patched with the appropriate (related) wall or partition material to insure the absence of an annular space.
5. Metal-clad cable (type MC) shall only be used for luminaire whips.

C. Below grade:

1. Furnish and install conduit systems below grade substantially as shown on the drawings, parallel to building walls (except where shown otherwise), pitched and arranged to permit effective drainage and in strict accordance with designated burial depths.
2. Provide trenching, backfilling and compacting in accordance with the requirements set forth in Division 2 and/or as shown on the drawings.

D. Sleeves:

1. Furnish and install sleeves where conduit systems pass through building walls and floors in accordance with the following:
 - a. Units penetrating walls and floors below grade shall be as detailed ("Sleeves Below Grade , Floors and Walls").
 - b. Units penetrating floors shall be Schedule 40, black steel (ASTM A-53) arranged to provide a waterproofing flange by projecting 1/2 inch above finished floor (except in Mechanical/Electrical Equipment Rooms where the projection shall be 2 inches above finished floor).
 - c. Openings through existing walls or partitions constructed of solid masonry shall be core drilled and shall not require sleeves.
2. Seal annular spaces with intumescent, synthetic elastomer (3M brand Fire Barrier; Caulk CP 25, Putty 303).

END OF SECTION

SECTION 26 61 20
600 VOLT WIRE AND CABLE

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install wire and cable in accordance with parameters shown on the drawings and herein specified.
- B. Units shall be Underwriters Laboratories listed; complete with conductors, insulation, identification, color coding and connectors.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Cerro Wire, Encore Wire, Southwire Company, General Cable or approved equal.

2.02 DESCRIPTION

- A. Conductors:
 - 1. Material:
 - a. Copper.
 - 2. Construction:
 - a. No. 10 AWG and smaller:
 - 1) Solid.
 - b. No. 8 AWG and larger:
 - 1) Stranded.
- B. Insulation (600 volts or less):
 - 1. No. 10 AWG and smaller:
 - a. THHN/THWN-2.
 - 2. No. 8 AWG and larger:
 - a. THHN/THWN-2.
- C. Identification:
 - 1. Clearly marked (at regular intervals) size, type, voltage, Underwriters Laboratories listing.

D. Color coding:

1. 120/208 volt, 3-phase:
 - a. Phase:
 - 1) Black, red, blue.
 - b. Neutral:
 - 1) White.
 - c. Ground:
 - 1) Green.
2. 277/480 volt, 3-phase:
 - a. Phase:
 - 1) Brown, orange, yellow.
 - b. Neutral:
 - 1) Gray.
 - c. Ground:
 - 1) Green with yellow stripe.

E. Connectors:

1. General:
 - a. Factory fabricated.
 - b. Appropriate class, type, material, size, ampacity, temperature rating.
2. No. 10 AWG and smaller:
 - a. Insulated wire nut with locking spring type insert.
 - b. Solderless, long barrel compression type.
3. No. 8 AWG and larger:
 - a. Split bolt type.

PART 3 – EXECUTION

3.01 MINIMUM SIZES

A. Power and lighting circuits:

1. No. 12 AWG.
- B. Control circuits:
 1. No. 14 AWG.
- C. Neutrals:
 1. Equal to phase conductors.

3.02 INSTALLATION

- A. All components of each designated conduit system shall be complete prior to pulling conductors.
- B. Apply water soluble, Underwriters Laboratories listed pulling lubricant only as required and then as sparingly as possible; thereafter, thoroughly remove residual lubricant from accessible conductors within switchgear, switchboards, panelboards, junction boxes, pull boxes, wireways, etc.
- C. Insulate connections with Underwriters Laboratories listed heat shrinkable insulators, molded composition covers and/or plastic tape.
- D. Neatly train, lace and arrange conductors within panelboards, junction boxes, pull boxes, wireways, terminal cabinets, etc. to complement access and facilitate modifications.

END OF SECTION

SECTION 26 61 30

RECEPTACLE, DEVICE, PULL AND JUNCTION BOXES

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install receptacle, device, pull and junction boxes in accordance with the parameters shown on the drawings and herein specified.
- B. Units shall be sized in accordance with the guidelines set forth in the National Electrical Code (Article 370).
- C. Units shall be Underwriters Laboratories listed.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Appleton, Raco, Steel City or approved equal.

2.02 DESCRIPTION

- A. Interior, dry locations:
 - 1. Cadmium plated, code gauge steel.
- B. Exterior and interior, wet locations:
 - 1. Cadmium plated cast alloy, threaded hubs, gasketed cover, stainless steel fasteners, NEMA 3R.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Boxes shall be securely mounted to the building construction and shall not be supported by the associated conduit system.
- B. Boxes shall be fully recessed, positioned level and plumb and properly aligned relative to the associated room finishes.
- C. Actual locations shall be coordinated with other elements contributing to the aesthetics of the associated wall elevation (complete with complementary bar hangers as required).
- D. Boxes serving two or more devices shall be the multiple gang type.

END OF SECTION

SECTION 26 61 40

RECEPTACLES AND SWITCHES

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install receptacles and switches in accordance with the parameters shown on the drawings and herein specified.
- B. Units shall be Underwriters Laboratories listed.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. General Electric, Hubbell, Leviton, Pass & Seymour or approved equal.

2.02 DESCRIPTION

- A. Receptacles:
 - 1. General:
 - a. Classification:
 - 1) Specification grade, extra hard use.
 - b. Arrangement:
 - 1) 2-pole, 3-wire.
 - c. Construction:
 - 1) High impact thermoplastic (nylon) face, thermoplastic back body.
 - d. Contacts:
 - 1) Triple wipe, T-slot, one-piece copper alloy.
 - e. Strap:
 - 1) Wraparound, securely interlocked, receptacle box grounding clip.
 - 2. General purpose type:
 - a. 20 ampere, 125 volts, NEMA configuration 5-20R, back and side wired, color selected by architect.
 - b. Pass & Seymour 5362 Series.
 - 3. Ground fault circuit interrupter (self-test) type:

- a. 20 ampere (feed-through), 125 volts auto-ground, self-test, indicator light, NEMA configuration 5-20R, side-wired, color selected by architect.
 - b. Pass & Seymour 2097 Series.
 - 3. Ground fault circuit interrupter/weather-resistant (self-test) type:
 - a. 20 ampere (feed-through), 125 volts, auto-ground, self-test, indicator light, Safelock, NEMA configuration 5-20R, back or side-wired, color selected by architect.
 - b. Pass & Seymour 2097TRWR Series.
 - 4. Transient voltage surge suppressor type:
 - a. 20 amp, 125 volts, hospital grade, NEMA configuration 5-20R, back and side wired, MOV surge protection of 210 joules in three modes, 500V nominal let-through (suppressed) in three modes, RFI and EMI noise filtration of 7:1 reduction, audible alarm with LED monitor light, color selected by architect.
 - b. Pass & Seymour 8200-ISP Series.
 - 5. USB chargers type:
 - a. 20 ampere, 125 volts, NEMA configuration 5-20R, back and side wired, thermoplastic tamper resistant black "invisis-shutters", one usb type a port and one usb type c port, color selected by architect.
 - b. Pass & Seymour TR20USBAC series.
- B. Switches:
- 1. General:
 - a. Classification:
 - 1) Specification grade, hard use.
 - b. Construction:
 - 1) Arc resistant thermoset material body, thermoplastic polycarbonate toggle switch handle, heavy duty mounting strap.
 - c. Operating components:
 - 1) Oversize silver alloy contacts, heavy gauge one-piece bronze alloy contact arm, cam (fast "make" and positive "break" response), heavy duty (quiet operation) bumper pads.
 - 2. General purpose type:
 - a. 20 ampere, 120/277 volts, back and side wired, color selected by architect.

- b. Pass & Seymour CSB20AC Series.
- C. Wall plates:
 - 1. Interior:
 - a. Thermoplastic, high impact, self-extinguishing nylon, smooth finish, color selected by architect.
 - b. Pass & Seymour TP Series.
 - 2. Exterior:
 - a. UV stabilized high impact polycarbonate, while-in-use, gasket, wet location, extra-duty application, NEMA 3R, opaque gray.
 - b. Intermatic WP5000 Series.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Wall plates serving 2 or more devices shall be the multiple gang type.
- B. Orientation:
 - 1. Receptacles:
 - a. Vertical (whenever possible).
 - b. Ground outlet up.
 - 2. Switches:
 - a. Toggle up when controlled device(s) is energized.

3.02 APPLICATION

- A. Special purpose switches:
 - 1. Pilot lighted type (toggle glows when controlled device(s) is energized):
 - a. When the controlled device(s) is not visible from the associated switch.
 - 2. Lighted type (toggle glows when controlled device(s) is de-energized):
 - a. Mechanical equipment rooms.
 - 3. Locking or security type (key operated):
 - a. Where noted.
- B. Ground fault circuit interrupter type receptacles:

1. Provide ground fault circuit interrupter receptacles where indicated on the floor plans.
4. Provide ground fault circuit interrupter/weather resistant receptacles at the building exterior where indicated on the floor plans.

END OF SECTION

SECTION 26 61 70

SAFETY SWITCHES

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install safety switches in accordance with the parameters shown on the drawings and herein specified.
- B. Units shall be the heavy duty type (single throw/double throw); Underwriters Laboratories listed.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Eaton, General Electric, Siemens, Square D or approved equal.

2.02 DESCRIPTION

- A. Enclosure:
 - 1. NEMA classification:
 - a. No. 1 (unless otherwise noted).
 - 2. Material:
 - a. Phosphatized, galvanized steel.
 - 3. Finish:
 - a. Baked enamel.
- B. Interior:
 - 1. Arrangement:
 - a. Visible blades, front removable lugs, neutral and/or grounding kits (as required).
 - 2. Construction:
 - a. Plated (corrosion resistant) current carrying components.
 - 3. Fuse holders:
 - a. Spring loaded, rejection kit (for current limiting fuses).
- C. Mechanism:
 - 1. Operating handle:

- a. Integral with box (not cover), lockable in "On" and "Off" positions, indicative of switch ("On" – "Off") status (by virtue of position).
2. Action:
- a. Quick-make, quick-break (arranged to prevent operating handle induced restraint once contact movement is initiated), dual cover interlock, control circuit interlock.

END OF SECTION

SECTION 26 61 90
SUPPORTING SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install supporting systems for conduit systems and equipment.

1.02 STANDARDS

- A. Conduit system attachments, structural attachments, hanger rods, channels, fittings and hardware systems shall conform with the requirements set forth in the Metal Framing Manufacturers Association Standard Publication MFMA-1.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. B-Line, Erico, Kindorf, Superstrut, Unistrut or approved equal.

2.02 DESCRIPTION

- A. Basic components (conduit system attachments, structural attachments, hanger rods, channels, fittings and hardware systems).
 - 1. Stock, production units.
- B. Finish:
 - 1. Hot-dip, galvanized.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Systems shall be capable of properly supporting each conduit system, including provisions for:
 - 1. Expansion and contraction (movement shall not cause disengagement).
 - 2. Preventing excessive stress.
 - 3. Threaded vertical adjustment subsequent to installation.
- B. Hanger rods shall be subjected to tensile loads only; where axial or lateral movements are anticipated, suitable linkages shall be provided.
- C. Supporting systems shall be secured to the building structural system (as shown), NOT to ROOF decks or components of the mechanical and electrical systems

(ductwork, piping, conduit, etc.); however, attachments serving conduit 2 inches and smaller may be secured to FLOOR decks.

- D. Conduit systems shall be independently supported from equipment, boxes, cabinets, etc.
- E. Trapeze or other multi-conduit support arrangements shall be constructed to accommodate 25 percent additional conduits.

END OF SECTION

SECTION 26 64 71

PANELBOARDS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install branch circuit and distribution panelboards in accordance with the parameters shown on the drawings and herein specified.
- B. Units shall be the circuit breaker type; Underwriters Laboratories listed; service entrance labeled, as applicable; have an interrupting capacity rating equal to the lowest device (panelboard/circuit breakers); complete with enclosure, bus bar assemblies and circuit breakers.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Eaton, General Electric, Siemens, Square D or approved equal.

2.02 DESCRIPTION

- A. Enclosure:
 - 1. NEMA classification:
 - a. No. 1 (unless otherwise noted).
 - 2. Front:
 - a. Arrangement:
 - 1) Dead front, hinged (to conveniently expose gutters).
 - 2) Hinged door.
 - b. Door:
 - 1) Flush cylinder type lock (keyed alike), 2 keys, spring-loaded stainless steel door pull.
 - 2) Circuit directory.
 - c. Finish:
 - 1) Baked enamel.
 - 3. Back-box:
 - a. Recessed:

- 1) Phosphatized, galvanized steel.
 - b. Exposed:
 - 1) Steel, removable endwalls.
 - 2) Baked enamel finish.
- B. Bus bar assemblies:
 - 1. Construction:
 - a. Plated (corrosion resistant) copper bus, insulated bus structure.
 - 2. Arrangement:
 - a. Bolt-on breaker compatible, phase sequenced.
- C. Circuit breakers:
 - 1. Type:
 - a. Thermal-magnetic, molded case, bolt-on.
 - 2. Mechanism:
 - a. Operating handle:
 - 1) Integral crossbar (to insure simultaneous response of multiple pole circuits), positive indication ("On"- "Off"- "Tripped").
 - b. Action:
 - 1) Quick-make, quick-break.
 - 3. Marking:
 - a. Single pole, 15A and 20A.
 - 1) SWD.
 - b. Multiple pole, 15A to 100A:
 - 1) HACR.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Stub spare conduits in an accessible location above suspended ceiling systems for each recessed unit:
 - 1. Branch circuit panelboard:

- a. Four 3/4 inch.
- 2. Distribution panelboard:
 - a. Two 1-1/4 inch, one 2 inch.
- B. Unit directories shall provide a typewritten account of branch circuit and distribution feeder loads by using the appropriate alphanumerical designations shown on the drawings and by illustrating the precise lighting fixture and receptacle arrangement.

3.02 IDENTIFICATION

- A. Units shall be identified with engraved, phenolic nameplates indicating:
 - 1. Branch circuit panelboard alphanumerical designation, characteristics and power source (branch circuit panelboard, distribution panelboard, distribution switchboard, etc.) and location (1/2 inch letter size); example:

P-1A
208Y/120V
PS: DP-2A, 2ND FL, ROOM 242
 - 2. Distribution panelboard alphanumerical designation, characteristics and power source (distribution panelboard, distribution switchboard, unit substation, etc.) and location (3/4 inch letter size); example:

DP-2C
480Y/277V
PS: SB-1A, 1ST FL, RM 119

END OF SECTION

SECTION 26 65 11

INTERIOR LIGHTING FIXTURES (LED)

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install interior lighting fixtures in accordance with the parameters shown on the drawings and herein specified.
- B. Units shall be Underwriters Laboratories listed; complete with housing, door/frame, lens, LED modules, LED driver and accessories.
- C. Units shall be tested to IESNA LM-79 and LM-80.
- D. Units shall have designs lights consortium approval.

1.02 SUBMITTALS

- A. Fixture submittals shall be tendered in bound form (booklet, ring binder, etc.) with a designated, indexed section for each type.
- B. Fixture descriptions shall include:
 - 1. Alphanumeric designation (matching bidding documents) and corresponding generic description.
 - 2. Product literature (including that for associated ballasts and lamps), edited and highlighted to indicate all parameters set forth in the bidding documents.
 - 3. Photometric data.
 - 4. Dimensioned drawings.
 - 5. IESNA TM21-11 DATA.

1.03 WARRANTY

- A. The system shall be warranted by the manufacturer to be free from defects in equipment, materials and workmanship for a period of 5 years from the date of final acceptance by the Owner, during which time all above mentioned defects shall be corrected and all services incidental to proper performance shall be provided free of charge.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Columbia, Day-Brite, Hubbel, Lightolier, Lithonia, Metalux, H.E. Williams or approved equal.

2.02 DESCRIPTION

- A. General:
 - 1. Refer to Fixture Schedule shown on drawings.
- B. Recessed or surface mounted, static troffers:
 - 1. Housing:
 - a. Rigid, die formed, 22 gauge steel.
 - 2. Door/frame:
 - a. Mitered corners, guide post spring loaded latches, safety chain.
 - 3. Finish:
 - a. Phosphatized, high reflectance baked white enamel (unless otherwise noted); paint after fabrication.
 - 4. Lens:
 - a. 0.125 inches (minimum), virgin acrylic, prismatic (unless otherwise noted).
- C. Accessories:
 - 1. Connectors, finish rings, trim pieces, end caps, light traps and/or gaskets, sockets.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Arrange units as shown on the drawings, complete with necessary adjustments to assure a coordinated installation relative to work (ceiling systems, diffusers and grilles, fire alarm system devices, sprinkler heads, fire suppression system discharge nozzles, etc.) performed by other trades.
- B. Units shall be complete with design features and all necessary accessories required to properly accommodate the associated ceiling system (exposed grid, concealed spline, plaster, metal pan, etc.).
- C. Support units level and plumb from the building structural system (directly or indirectly, complete with necessary secondary framing) with two supports, minimum (multiple attachments as required), in conformance with the following:
 - 1. Suspended ceiling systems (units weighing 5 pounds or more):
 - a. #9, galvanized steel ceiling wire.
 - 2. Structural ceiling systems (units weighing 5 pounds or more):
 - a. Bridge ceiling system structure.

3. Exposed units (without ceiling systems):
 - a. 1/8 inch, steel aircraft cable.
 - b. #14, zinc plated, steel jack chain.
 - c. 1/4 inch, threaded, galvanized, steel rod.
- D. Thoroughly clean fixture exposed surfaces, lenses and lamps.
- E. Wire unwired and rewire units as required to accommodate lighting systems parameters.

END OF SECTION

SECTION 26 66 20
EMERGENCY LIGHTING SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install emergency lighting systems in accordance with the parameters shown on the drawings and herein specified.
- B. Systems shall be the fully automatic type; Underwriters Laboratories listed; complete with enclosure, battery, charger/controller and lamp(s).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Dual-Lite, Siltron, Lightolier or approved equal.

2.02 DESCRIPTION

- A. Enclosures:
 - 1. Remote units:
 - a. NEMA 1, heavy gauge steel, baked-on finish.
 - 2. Self contained units:
 - a. Injection-molded, thermoplastic.
- B. Battery:
 - 1. Maintenance free, sealed, pure lead type, 90 minute capacity, 15F to 115F environmental range, 15 year life, 12 volt.
- C. Charger/controller:
 - 1. General:
 - a. Solid state, micro-processor based.
 - b. Self-diagnostic.
 - c. Universal transformer, 120/277V AC.
 - 2. Operating and safety controls:
 - a. Automatic transfer to battery (commercial power failure to low voltage condition).
 - b. Automatic transfer to commercial power subsequent to 15 minute time delay.

- c. Low voltage disconnect for battery protection.
 - d. Programmed discharge test (5-minute at 1 month intervals; 30-minute at 6 month intervals).
 - e. Manual discharge test (5-minute).
- 3. Indication (LED):
 - a. Charger mode (equalize or float).
 - b. Failure (battery, charger, transfer circuitry, lamps).

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Top of the unit shall be mounted no higher than 8'-0" above finished floor or stair riser located directly below unit to allow for unit testing and head positioning accessibility.
- B. Wiring:
 - 1. Conductor sizes shall conform with the tabulation parameters shown on the drawings.

END OF SECTION

SECTION 26 67 21 I

ADDRESSABLE FIRE ALARM AND DETECTION SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install fire alarm and detection systems in accordance with the parameters shown on the drawings and herein specified.
- B. Refer to Section 266010, *General Provisions*, for requirements relative to submittals, accessories and components, installation, removals, protection, maintenance manual, systems demonstration and instruction; additionally, Section 266111, *Conduit Systems*, and Section 266120, *Wire and Cables* shall apply.
- C. Systems shall be the modular, microprocessor based, distributed intelligence, field programmable (password protected), direct current, supervised type; Underwriters Laboratories listed, Factory Mutual approved, National Fire Protection Association, NFPA 72 – National Fire Alarm Code, The Americans With Disabilities Act compliant, National Fire Protection Association standard(s) compliant, complete with control unit(s), controllable relay module(s), controllable signal module(s), conventional zone module(s), power supply, addressable input and output modules, remote conventional zone module(s), conventional and intelligent initiating devices, interface module(s), printer, signaling devices and wiring system(s).

1.02 GUARANTEE

- A. The system shall be guaranteed to be free from defects in materials and workmanship for a period of one year from the date of final acceptance by the Owner, during which time all above mentioned defects shall be corrected and all services incidental to proper performance shall be provided free of charge.

1.03 SOURCE AND SERVICE

- A. Source:
 - 1. Basic systems components and associated accessories shall be furnished by a single manufacturer through a factory authorized distributor.
- B. Service:
 - 1. Systems service shall be available from the manufacturer's authorized distributor (located within a 50 mile radius) 24 hours of every day via qualified factory trained technicians.

1.04 QUALIFICATIONS

- A. Licensed for the installation of fire alarm systems in the State of New York.
- B. Authorized installer for product supplied. Authorization letter from manufacturer required upon request.

1.05 SCOPE OF WORK

- A. Work shall be the replacement or extension of the building's existing fire alarm and detection systems.

1.06 FABRICATION DRAWINGS, MATERIAL LISTS AND EQUIPMENT SUBMITTALS

- A. Prior to installation, submit fabrication drawings, material lists and equipment submittals (shop drawings) for approval in accordance with the following:
 - 1. Complete description (manufacturer's cut sheets) data indicating UL listing for all network components.
 - 2. Complete sequence of operation of all functions.
 - 3. A list of every address of every device connected to a network node that is provided for purposes of alarm initiation, status monitoring, supervised notification appliance circuits and auxiliary control.
 - 4. Complete wiring diagrams for components and interfaces to equipment supplied by others.
 - 5. A listing of the manufacturer's representatives responsible for installation coordination and service.
 - 6. Drawings (1/8 inch, scale, minimum) shall indicate location of all controls, alarm actuating devices and notification appliance devices as shown and/or noted on contract drawings.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Fire-Lite Alarms by Honeywell or approved equal.

2.02 DESCRIPTION

- A. Control unit:
 - 1) Main control board:
 - a. General:
 - 1) 16 bit processor, non-volatile ROM, flash EPROM.
 - 2) Modular construction incorporating expansion card cage, analog loop driver(s), indicating appliance circuits, auxiliary relays.
 - b. Uninterruptible power system:
 - 1) Battery charger/transfer:

- a) Automatic transfer, operating control protection (overcurrent, overcharge, deep discharge, polarity reversal), trouble indicating LED (yellow), 48-hour charging capacity.
- 2) Battery module:
 - a) 24V, sealed, lead acid array; sufficient capacity to operate the system for an 8-hour period.
- 2) Annunciator/keypad:
 - a. 80 character, backlit, alphanumeric display; 10 digit, numeric keypad with audible keypress feedback.
 - b. Visual indication (LED's):
 - 1) System power (GREEN).
 - 2) Trouble (YELLOW).
 - 3) Supervisory (YELLOW).
 - 4) Security (YELLOW).
 - 5) Alarm (RED).
 - 6) Audibles (RED).
 - 7) Partial system disable (YELLOW).
 - c. Momentary contact switches:
 - 1) Locate (address).
 - 2) Next alarm.
 - 3) Next trouble.
 - 4) Display hold.
 - 5) Acknowledge/silence.
 - 6) Reset.
 - d. Programmable function keys:
 - 1) City disconnect.
 - 2) Manual evacuation (drill).
 - 3) Elevator bypass.
 - 4) Door holder release bypass.
 - 5) Fan shutdown.

- 6) Future.
- e. Gamewell – FCI Model LCD-E3.
- 3) Power supply:
 - a. Input:
 - 1) 120V AC, 2-wire, fused.
 - b. Output:
 - 1) Rectified, full wave 24V DC, fused.
- 4) Enclosure:
 - a. 16 gauge steel (back-box and door cover assembly), piano hinge (left or right hand as shown), viewing slits (permitting component identification), dead front (except display and hold buttons), key lock.
- 5) Universal digital alarm communicator transmitter (UDACT):
 - a. Compact, internally housed, supervised, connections for dual telephone lines, field programmable, transmits trouble or supervisory conditions, 32 alarm points, password protected,
- 6. Fire-Lite Alarms Model MS-9200UDLS.
- B. Printer:
 - 1. Event and status logging, 9-pin, impact, dot matrix, 232 CPS, internal menu driven program, continuous tractor feed, cable.
 - 2. Fire-Lite Alarms Model PRN-7.
- C. Initiating devices:
 - 1) Detectors:
 - a. General:
 - 1) Plug-in, twist/lock, (self-wiping contacts), lockable, screw terminals.
 - 2) Integral LED alarm indicator; remote alarm indicator, relay base or audible base as noted/or required.
 - b. Photoelectric smoke, intelligent/analog:
 - 1) Light scattering (light emitting diode source; light sensing photo diode receiver), easily cleanable, integral microprocessor based circuitry.
 - 2) Fire-Lite Alarms Model SD-355, B210LP series base.

- c. Thermal, rate compensated/fixed temperature, intelligent:
 - 1) Aluminum tubular shell with interior struts and contacts, shock and corrosion resistant, self-restoring, integral microprocessor based circuitry, multi-color LED status indicator, programmable as fixed temperature only.
 - 2) Fire-Lite Alarms Model H355R, B210LP series base.
- d. Carbon monoxide, conventional:
 - 1) Trouble relay, screw terminals, sounder, RealTest CO gas technology, dual color LED indication.
 - 2) Fire-Lie Alarms Model CO1224T
- 2) Manual station, intelligent:
 - a. Double action, "pull down" lever ("lock-in" operation subsequent to releasing a spring-loaded contact switch), molded (red) polycarbonate housing with raised white lettering, integral microprocessor based circuitry, reset tool package.
 - b. Fire-Lite Alarms Model BG-12LX.

D. Signaling devices:

- 1) Horn/strobe:
 - a. Wall-flush or surface mounted (as applicable), 12 or 24 VDC, ADA compliant xenon flash tube strobe, eleven field selectable candela settings (15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177 or 185), clear polycarbonate lens, rectangular red housing with white "Fire" lettering, temporal 3 or non-temporal field selectable alerting sounds, adjustable internal volume control for three dBA output levels.
 - b. System Sensor SpectrAlert series P2R/PAR
- 2) Horn/strobe:
 - a. Ceiling, flush mounted, 12 or 24 VDC, ADA compliant xenon flash tube strobe, eleven field selectable candela settings (15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177 or 185), clear polycarbonate lens, rectangular red housing with white "Fire" lettering, temporal 3 or non-temporal field selectable alerting sounds, adjustable internal volume control for three dBA output levels.
 - b. System Sensor SpectrAlert series PC2R/PC4R.
- 3) Strobe:
 - a. Wall-flush or surface mounted (as applicable), 12 or 24 VDC, ADA compliant xenon flash tube strobe, eleven field selectable candela

settings (15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177 or 185), clear polycarbonate lens, rectangular red housing with white "Fire" lettering.

b. System Sensor SpectrAlert series SR.

4. Strobe:

a. Ceiling, flush mounted, 12 or 24VDC, ADA compliant xenon flash tube strobe, eleven field selectable candela settings (15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177 or 185), clear polycarbonate lens, rectangular red housing with white "Fire" lettering, temporal 3 or non-temporal field selectable alerting sounds, adjustable internal volume control for three dBA output levels.

b. System Sensor SpectrAlert Series SCR.

5. Weatherproof horn/strobe:

a. Surface mounted in weatherproof back-box ADA compliant xenon flash tube strobe, eleven field selectable candela settings, (15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177 or 185), clear polycarbonate lens, temporal 3 or non-temporal field selectable alerting sounds, adjustable internal volume control for three dBA output levels.

b. System Sensor SpectrAlert SRHK series.

E. Notification appliance circuit power extender:

1. 120 VAC input, 8 amp (24 VDC) output with 1.5 amp (24 VDC) auxiliary output, , four-3 amp (24 VDC) power limited outputs, 120 VDC sealed lead acid battery – 12 amp/hour minimum (2 per system), battery charger, earth detect module.

2. Fire-Lite Alarms model FCPS-23 FS6.

F. Control devices:

1) Addressable monitor module (single input):

a. Microprocessor based integrated circuit.

b. Intelligent control function interface utilizing form C relay; uniquely identifiable address, multi-color LED status indicator.

c. Fire-Lite Alarms – Model MMF – 300.

2) Magnetic hold-open:

a. Electromagnet assembly encased in brushed aluminum housing, extended door armature assembly, doorplate and outlet box bracket.

b. 12 VDC, 24 VAC/DC or 120 VAC operation.

c. 35 lb holding force.

- d. Floor or wall mounted and flush or surface mounted (as applicable).
 - e. Fire-Lite Alarms FM980/990 series.
3. Synchronization module:
- a. 9 to 17.5 VDC or 17 to 33 VDC input, 3 amp (12 or 24 VDC) output, strobe synchronization at 1 Hz, horns synchronization in temporal 3 pattern, one class A or two class B circuits.
 - b. System Sensor SpectrAlert model MDL3R or MDL3W.
- G. LCD Annunciator:
- 1. Same "look and feel" as the control panel operator interface, shall use the same "Primary Acknowledge", "Silence" and "Reset Keys", status LED's and LCD display as the FACU.
 - 2. Under normal conditions, the LCD shall display a "SYSTEM NORMAL" message and the current time and date.
 - 3. Should an abnormal condition be detected, the appropriate LED ("Alarm", "Supervisory" or "Trouble") shall flash. The unit audible signal shall pulse for alarm conditions and sound steady for trouble and supervisory conditions.
 - 4. The LCD shall display the following information relative to the abnormal condition of a point in the system:
 - a. 80 character custom location label.
 - b. Type of device (e.g., smoke, pull station, waterflow).
 - c. Point status (e.g., alarm, trouble).
 - 5. Operator keys shall be key switch enabled and password protected to prevent unauthorized use. The key shall only be removable in the disabled position. "Acknowledge", "Silence" and "Reset" operation shall be the same as on the FACU.
 - 6. Fire-Lite Alarms model ANN-80.

PART 3 – EXECUTION

3.01 SYSTEM ARRANGEMENT

- A. System arrangement shall be consistent with the component locations and riser diagram shown on the drawings.
- B. Precise as-built mark-ups (illustrating actual field wiring arrangements, device addresses and control panel configurations) shall be submitted to the Engineer.

3.02 SYSTEM OPERATION

- A. General:

1. Intelligent devices address shall be electronically established via the control unit with the capacity for isolation (disarming) without affecting the influence of other components or system operations.
 2. Intelligent devices shall be dynamically supervised (continuously) by the control unit for internal and/or external trouble conditions.
 3. System control unit processor and software shall be independently supervised and arranged to insure alarm initiation and indication in event of failure.
 4. Intelligent/analog initiating devices sensitivity adjustment and measurement shall be achieved via the control unit.
 5. Alphanumeric annunciator(s) and remote printer (upon request) shall list:
 - a. Alarms (time, date, location).
 - b. Troubles (time, date, location).
 - c. Output functions status ("On", "Off").
 - d. Remote relay status ("On", "Off").
 - e. Intelligent smoke detector sensitivity.
 - f. Initiating device address.
 - g. Acknowledgements (time, date).
 - h. Signal silences (time, date).
 - i. Resets (time, date).
 - j. Battery voltage, AC voltage, charging current.
 6. System programming shall include the capacity for time-related functions.
 7. The system shall be capable of being tested by one person by enabling the "walk-test" mode. Activating the "walk-test" mode shall:
 - a. Bypass central station connection.
 - b. Bypass control functions.
 - c. Cause a trouble condition at the control panel.
 - d. Reset the panel automatically after signaling is complete.
- B. System shall detect all changes in status of monitored points, initiate appropriate acts to alert/evacuate occupants, provide event annunciation and activate auxiliary controls as specified.
- C. Additionally, unless otherwise noted, ancillary system responses shall conform with the descriptions herein specified:

1. Normal condition:
 - a. Monitoring:
 - 1) Each smoke detector shall be polled 256 times per day to monitor and compensate for long term sensitivity drift due to contamination or aging.
 - b. Recording:
 - 1) The system shall store a record of alarm and trouble events in a nonvolatile history file. This file shall contain the most recent 6000 events with time and date of each. It shall be possible to select the number of events to be viewed in the history file by date.
 - c. Adjusting:
 - 1) The system shall measure, set and control the sensitivity of the addressable ionization and photoelectric detectors connected to it.
2. Test condition:
 - a. On command, an individual or all field devices may be tested, whereafter, results will be displayed at the central control panel.
 - b. Test shall actually simulate the presence of smoke in the detector's sensing chamber.
3. Alarm condition:
 - a. Upon alarm input, the system shall override any trouble conditions and provide the following outputs:
 - 1) Activate alarm audible/visual notification appliances (Uniform Code 3 temporal pattern).
 - 2) Automatically notify fire department and/or central station.
 - 3) Display input device address, type, state of input (alarm or trouble) and Owner designated message.
 - 4) Illuminate a flashing LED (alarm or trouble) and a "CONTINUE" LED if more than one input is activated and a pulsing alarm tone.
 - 5) Shut down fans, operate dampers, close fire doors, etc. as shown on the schedule.
 - 6) Activate elevator recall sequence.
 - a. Engaging "Alarm Silence Switch" shall silence alarms with LED alarm outputs and illuminate LED. Each operation of signal silence, trouble silence, acknowledge, city tie disconnect, lamp test and system reset switch shall cause a display

indication of operation with time and date. These operations shall be recorded in the system's history file.

- b. Multiple alarms shall sequentially display at not more than 5-second intervals until manually acknowledged. Once acknowledged, alarms shall be viewed by operating the "scroll" switch.
- 7) Subsequent alarm condition ("Alarm Silence" engaged) shall resound signals.
- 8) Alarm condition during CPU failure:
- a. Alarms shall bypass software to sound general alarm signals and light zone alarm LED.
- 9) Trouble condition:
- a. In response to a trouble condition:
 - 1) System trouble visual and audible indicators shall be energized.
 - 2) Trouble relay contacts shall change state.
 - 3) Remote trouble and silence stations shall receive a trouble signal.
 - 4) Supervised annunciator circuitry shall receive a high going, current-limited trouble signal.
 - b. Trouble conditions shall include:
 - 1) Circuit "open" for:
 - a. Alarm relay coil.
 - b. Audible signal.
 - c. Initiating device.
 - d. Module placement.
 - e. Municipal tie.
 - f. Remote station.
 - 2) Auxiliary power output fuse open.
 - 3) Audible signal circuit short.
 - 4) Circuit ground fault for:
 - a. Audible signal.

- b. DC power.
 - c. Initiating device.
- 5) Detector "drift" beyond alarm threshold level.
- 6) Failure of:
 - a. AC power input.
 - b. Battery charger/transfer.
- 7) Momentary contact switch not fully closed.
- 8) Remote station alarm silence switch not in normal position under non-alarm conditions.

3.03 INSTALLATION

A. General:

1. All existing components that are necessary to properly interface with the existing system, but are incompatible with the above requirements, shall be replaced.

B. Wiring:

1. It is the intent of this specification that all associated wiring shall be installed in compliance with power-limited fire protective signaling circuits in strict accordance with the National Electrical Code and shall be the responsibility of the Contractor, except that all final connections at the system control panels (in a neatly dressed fashion) shall be executed by an authorized technician who shall check for proper circuit resistance and shorts to ground prior to consummating the terminations.
2. All wiring shall be twisted, low voltage, shielded plenum cable; color code shall be maintained throughout.
3. Exposed wiring and/or concealed wiring (except that above accessible suspended ceiling systems) shall be installed in dedicated electrical metallic tubing with set-screw and compression type couplings and connectors for interior dry locations and interior wet locations or exterior locations, respectively.
4. All junction boxes shall be sprayed RED and labeled "FIRE ALARM".

3.04 PROGRAMMING

A. General:

1. Programming shall be executed by an authorized technician.

B. Operation:

1. Expandable and reprogrammable at any time up to system's maximum capacity.
2. Operating system shall be field programmable for program changes and shall not require any factory modifications.
3. Each addressable device shall be uniquely identified by an address code (Owner-selected) entered at time of installation.

3.05 SUPERVISION AND TESTING

i. General:

1. Supervision and testing shall be executed by an authorized technician.

ii. Supervision:

1. Provide "on-site" observation throughout the system construction period, lending all guidance necessary to insure a proper installation.
2. Perform the prescribed "systems demonstration" and "instruction".
3. Provide as-built drawings.

H. Testing:

- 1) Record:
 - a. Date.
 - b. Technician's name and certificate number.
 - c. Listing of installed equipment including location (address) and model and serial numbers for all initiating devices.
 - d. Statement that the system is properly installed.
- 2) Measure (with the associated HVAC systems operational) and record:
 - a. Ionization and photoelectric smoke detectors sensitivity.
 - b. Thermal and flame detectors response time.
3. Measure and adjust ionization smoke detectors (in their final location with the associated HVAC system operational) to insure the maximum stable sensitivity setting.
4. Record:
 - a. Technician's name and test date(s).
 - b. Model number, serial number, location and address for each initiating device.

- c. Voltage (sensitivity) settings for each ionization and photoelectric smoke detector.
- d. Response time for thermal detectors.

END OF SECTION

SECTION 26 67 44

COMMUNICATIONS CABINETS, RACKS, FRAMES AND ENCLOSURES

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install communications cabinets, racks, frames and enclosures in accordance with the parameters shown on the drawings and herein specified.
- B. Free standing relay racks shall be complete with vertical cable management, horizontal cable management, and all accessories (cable management spools, cable lashing bar, etc.) necessary for a complete system.
- C. Equipment/systems shall conform with the applicable portions of American National Standards Institute (ANSI), Telecommunications Industry Association (TIA), Electronic Industries Alliance (EIA), Telecommunications Distribution Methods Manual, 10th Edition, Building Industry Consulting Services International (BICSI), 2006.
- D. Systems shall conform with the applicable portions of the requirements set forth in the National Electrical Code (NFPA-70).
- E. Components shall be tested by Underwriters Laboratories and shall bear the associated label, seal or stamp of conformance.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Chatsworth Products Inc., or approved equal.

2.02 DESCRIPTION

- A. Free Standing Relay Racks (Standard Rack):
 - 1. Racks shall be manufactured from aluminum and/or steel extrusion.
 - 2. Each rack will have two L-shaped top angles, two L-shaped base angles and two C-shaped equipment-mounting channels. The rack will assemble with nut and bolt hardware. The base angles will be pre-punched for attachment to the floor.
 - 3. Equipment mounting channels will be 3" deep and punched on the front and rear flange with the EIA-310-D Universal hole pattern to provide 45, 51 or 58 rack-mount spaces relative to rack height for equipment. Each mounting space will be marked and numbered on the mounting channel.
 - 4. When assembled with top and bottom angles, equipment-mounting channels will be spaced to allow attachment of 19" EIA rack-mount equipment. Attachment points will be threaded with 12-24 roll-formed threads. The rack

will include assembly and equipment-mounting hardware. Racks will include 50 each combination pan head, pilot point mounting screws.

5. The assembled rack will measure 7' (84") high, as noted on documents, 20.3" wide and 15" deep. The sides (webs) of the equipment-mounting channels will be punched to allow attachment of vertical cable managers along the sides of the rack or for rack-to-rack baying.
6. The rack will be rated for 1,500 lb. of equipment.
7. Finish shall be either clear grained aluminum or epoxy-polyester hybrid powder coat in the color as specified below.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Assemble freestanding relay racks according to manufacturer's instructions. Verify that equipment mounting rails are sized properly for rack-mount equipment before attaching the rack to the floor.
- B. All racks must be attached to the floor in four places using appropriate floor mounting anchors. When placed over a raised floor, threaded rods should pass through the raised floor tile and be secured in the structural floor below.
- C. Racks shall be grounded to the Telecommunications Grounding Busbar (TGB) using appropriate hardware provided by the contractor. The ground will meet local code requirements and will be approved by the Authority Having Jurisdiction (AHJ).
- D. In seismic areas, the rack should have additional bracing as required by building codes and the recommendations of a licensed structural engineer.
- E. Ladder rack may be attached to the top of the rack to deliver cables to the rack. The rack should not be drilled to attach ladder rack. Use appropriate hardware from the ladder rack manufacturer.
- F. The equipment load should be evenly distributed and uniform on the rack. Place large and heavy equipment towards the bottom of the rack. Secure all equipment to the rack with equipment mounting screws.

END OF SECTION

SECTION 26 67 45

COMMUNICATIONS TERMINAL BLOCKS, PATCH PANELS AND PATCH CORDS/JUMPERS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install Category 6 patch panels and patch cords/jumpers used for cross-connect distribution of Category 6 balanced unshielded twisted pair (UTP) cabling in accordance with the parameters shown on the drawings and herein specified.
- B. Equipment/systems shall conform with the applicable portions of American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE) and Federal Communications Commission (FCC), Telecommunications Distribution Methods Manual, 14th Edition, Building Industry Consulting Services International (BICSI), and Information Transport Systems Installation Manual, 8th Edition.
- C. Systems shall conform with the applicable portions of the requirements set forth in the National Electrical Code (NFPA-70).
- D. Components shall be tested by Underwriters Laboratories and shall bear the associated label, seal or stamp of conformance.

1.02 WARRANTY

- A. The system shall be warranted by the manufacturer to be free from defects in equipment, materials and workmanship for a period of 1 year from the date of final acceptance by the Owner, during which time all above mentioned defects shall be corrected and all services incidental to proper performance shall be provided free of charge.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Hubbell NEXTSPEED or approved equal.

2.02 DESCRIPTION

- A. Category 6 patch panels:
 - 1. Design Requirements:
 - a. Category 6 patch panels shall be standard 8-position, RJ-45 style, un-keyed, FCC-compliant receptacle, in 48, port configurations.
 - b. Panel frames shall be black powder coated 14 gage steel with rolled edges top and bottom for proper stiffness.
 - c. Panels shall accommodate a minimum of 24 ports for each rack mount unit (1 RMU = 1.75 in.).

- d. Panels shall be designed for 4-pair, 100 ohm balanced unshielded twisted pair (UTP) cable.
- e. Panels shall terminate 26-22 AWG solid conductors, with maximum insulation diameter of 0.050 in.
- f. Panels shall have attached wiring instruction labels to permit either T568A or T568B wiring configurations.
- g. Panels shall have individual port identification numbers on the front and rear of the panel.
- h. Panels shall utilize 8-port adapter modules, each secured with two screws. Adapter module housings shall be UL 94 V-0 rated thermoplastic.
- i. Panel adapter modules shall be 110-style termination with tin lead solder plated IDC contacts.
- j. Panels shall have a temperature rating of -10 °C (14°F) to 70°C (158 °F).
- k. Printed circuit boards shall be fully enclosed front and rear for physical protection.
- l. Panel contacts shall accept a minimum of 2000 mating cycles without degradation of electrical or mechanical performance.
- m. Panel contacts shall maintain a minimum deflection force of 100 grams while mated with an FCC-standard RJ-45 plug.
- n. Panel contacts shall be formed flat for increased surface contact with mated plugs.
- o. Panel contacts shall be arranged on the PC board in 2 staggered arrays, one array having 6 contacts and the other array having 2 contacts.
- p. Panel contacts shall be constructed of Beryllium copper for maximum spring force and durability.
- q. Contact plating shall be a minimum of 50 micro-inches of hard gold in the contact area over 50 micro-inch of nickel.
- r. Panel termination method shall follow the industry standard 110 IDC punch-down, using a standard 110 impact termination tool.
- s. Panels shall be compatible with a 4-pair multi-punch impact termination tool designed specifically for the purpose. Bending or other damage to the panel using a multi-pair punch tool shall not occur.
- t. IDC contact termination towers shall have tapered pair-splitting features to aid wire insertion and minimize pair un-twist.

- u. IDC contacts shall be arranged in staggered arrays of 4 sets of 2 contacts.
 - v. Panels shall have the Category 6 designation, visible from the front when installed.
 - w. Panels shall utilize a paired punch-down sequence to maximize electrical performance.
 - x. IDC contacts shall be Phosphor Bronze with 100 micro-inch tin lead 60/40 plating over nickel.
 - y. Panels shall not require special cords, specialty tools or special installation requirements.
 - z. Panel adapter ports shall accept FCC compliant 6 position plugs, optional hinged dust covers and snap-on icons for specific identification.
 - aa. Space above the adapter ports shall be available for additional labeling per ANSI/TIA/EIA-606-A.
 - bb. Category 6 panels shall be backward compatible with existing Category 3, 5 and 5e cabling systems for fit, form, and function.
2. Performance Requirements:
- a. All transmission performance parameters shall be independently verified by a UL or ETL third party testing organization.
 - b. Category 6 panels shall meet or exceed Category 6 transmission requirements for connecting hardware, as specified in ANSI/TIA/EIA-568-B.2-1 Transmission Performance Specifications for 4-Pair 100 ohm Category 6 Cabling.
 - c. The manufacturer shall provide Category 6 component compliance certificates from third party testing organizations upon request.
 - d. Panels shall exceed IEEE 802.3af DTE Power specification to 4 times the rated current limits with no degradation of performance or materials.
 - e. Panels shall be third party verified, error free Gigabit Ethernet performance to IEEE 802.3ab.
 - f. Category 6 panels shall meet or exceed the 4-connector channel performance requirements of Category 6, per the ANSI/TIA/EIA-568-B.2-10 standard.
 - g. The 4-connector channel test configuration shall utilize Category 6 patch panels, Category 6 jack, and Category 6 patch cords, from the same manufacturer, with qualified Category 6 cable.
 - h. The 4-connector channel performance margins in the table below shall be guaranteed. Conditions of requirement No. g above apply exclusively.

- i. Category 6 panels shall meet the current draft 10 Gb/s performance requirements of IEEE 802.3an and TSB-155, for a maximum 55-meter channel length. Conditions of requirement no. g above apply exclusively.

ELECTRICAL PARAMETER (1 - 250MHZ)	GUARANTEED MARGINS TO CATEGORY 6 / CLASS E CHANNEL SPECIFICATIONS
Insertion Loss	3 %
NEXT	4 dB
PSNEXT	5 dB
ELFEXT	4 dB
PSELFEXT	5 dB
Return Loss	2 dB

B. Category 6 patch cords/jumpers:

1. Design Requirements:

- a. Category 6 patch cable, 24 AWG 7132 tinned copper stranded conductors, insulated with polyethylene and UL flame-retardant PVC jacket.
- b. Length as required to meet needs.
- c. Color as noted on floor plans and/or details.
- d. Factory terminated, double ended, third party component tested and verified.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Horizontal and backbone cabling of the proper category shall be fully deployed into the TR, TE or ER according to applicable codes and standards.
- B. Cable slack, service loops, bend radii, and pathway fill ratio shall comply with applicable codes and standards.
- C. Metallic horizontal cable pathways shall be bonded to an approved ground.
- D. Cable ends for termination shall be clean and free from crush marks, cuts, or kinks left from pulling operations.

3.02 INSTALLATION

- A. Properly mount patch panels into the designated rack, cabinet, or bracket locations with the #12-24 screws provided.
- B. Terminate cables into the patch panel according to manufacturer's instructions.

- C. To maximize transmission performance, maintain wiring pair twists as close as possible to the point of termination.
- D. The length of wiring pair un-twist in each termination shall be less than 0.5 inches (13 mm).
- E. Horizontal or backbone cables extending from the panel terminations shall maintain a minimum bend radius of at least 4 times the cable diameter.
- F. Cable terminations shall have no tensile or bending strain on panel IDC contacts in each installed location.
- G. For horizontal cabling, jacks shall be terminated with faceplates assembled complete and properly mounted.
- H. Consolidation point equipment, where applicable, shall also be fully installed and terminated prior to testing.
- I. Panels shall be properly labeled on front and back with the cable number and port connections for each port.

3.03 FIELD QUALITY CONTROL – TESTING

- A. Panels shall be tested as part of the installed horizontal or backbone cabling system.
- B. Each link or channel in the horizontal or backbone cabling system shall be identified and tested individually, using an industry standard level III tester with proper settings, including the correct cable NVP value.
- C. Each backbone or horizontal link/channel shall be tested to Category 6 parameters listed in the table below. (Note: a level III tester will produce all results below automatically)

Wire Map / Continuity	Length	Insertion Loss
NEXT	PSNEXT	ELFEXT
PSELFEXT	Delay and Delay Skew	Return Loss

- D. A "PASS" indication shall be obtained for each channel or link, using a level III tester.
- E. Completed test reports shall be submitted per contract requirements of Division 01 Section 01 33 19: Field Test Reporting.

END OF SECTION

SECTION 26 67 46

COMMUNICATIONS CABLE MANAGEMENT

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install communications cable management system in accordance with the parameters shown on the drawings and herein specified.
- B. System shall include vertical cable management, horizontal cable management, and all accessories (cable management spools, cable lashing bar, etc.) necessary for a complete system.
- C. Systems shall conform with the applicable portions of American National Standards Institute (ANSI), Telecommunications Industry Association (TIA), Electronic Industries Alliance (EIA), Telecommunications Distribution Methods Manual, 14th Edition and Building Industry Consulting Services International (BICSI).
- D. Systems shall conform with the applicable portions of the requirements set forth in the National Electrical Code (NFPA-70, 2023 Edition).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Chatsworth Products Inc., or approved equal.

2.02 DESCRIPTION

- A. Vertical Cable Management for Racks/Frames (Evolution™ Cable Management):
 - 1. Every rack/frame shall have a minimum of one vertical cable manager. The vertical cable manager shall create a space for storing and organizing cables along the side of the rack/frame. The cable manager shall maintain separation between patch/equipment/jumper cords and premise cables.
 - 2. The vertical cable manager shall match the height of the rack(s)/frame(s).
 - 3. The vertical cable manager shall bolt to the side of racks/frames with included hardware.
 - 4. The cable manager shall be sized to match cabling requirements. The initial quantity of cables within the cable manager shall not exceed a whole number value equal to 40% of the interior area of the cable manager.
 - 5. A single vertical cable manager may be used in between bayed racks/frames if it is sized to match cable requirements for both racks/frames.
 - 6. The vertical cable manager shall be a single-sided C-shaped trough with a door or a double-sided H-shaped trough with two doors. The single-sided trough shall provide a single pathway. Three fixed position accessory

mounting panels shall allow attachment of cable management accessories at the back of the manager. The double-sided trough shall provide independent front and rear cable pathways and shall have three movable mid-sections to hold cable management accessories. The movable mid-sections shall adjust front-to-rear to allow a 40/60, 50/50 or 60/40 front/rear split of the interior cable management space. The back of both managers shall be mostly open to allow easy cable pass-through.

7. The door shall be removable, hinged to open from the right or left side, with a two-point latch and a single knob on the right and left side to secure the door in the closed position. The front door on single- and double-sided managers shall have a two-tone finish: black with a vertical aluminum panel at the center. The rear door on double-sided cable managers shall be flat with a black finish.
 8. The vertical cable manager shall have cable openings along both sides of the trough. The openings shall be formed by evenly-spaced T-shaped cable guides. The T-shaped cable guides shall be made from a composite plastic material (not metal) and shall have rounded edges to protect cables. When the cable manager is attached to a rack/frame, each cable opening shall align with a rack-mount space (RMU) on the rack/frame. Each opening shall pass a minimum of 24 each .25" OD patch cords.
 9. The cable manager shall be delivered individually boxed, and available in several widths as specified below and in the contract documents.
 10. The vertical cable manager shall be manufactured from steel, aluminum and plastic.
 11. Finish shall be epoxy-polyester hybrid powder coat paint to match the communications rack. T-shaped cable guides and latch hardware shall be black.
 12. Internal cable management accessories will include cable management spools that attach to the panels/mid-sections to provide slack management for patch cords; a cable lashing bar kit to provide tie points for cable bundles at the rear/mid of the manager; and a fiber segregation kit that creates a separate pathway inside the manager to separate fiber from other cables.
- B. Horizontal Cable Management for Racks/Frames (Evolution™ Cable Management):
1. Place horizontal cable managers above and below each patch panel on/in each rack/frame. The horizontal cable manager will guide patch/equipment cords between the vertical cable manager and individual network port connections.
 2. The horizontal cable manager shall match the rack-mount width of the rack(s)/frame(s).
 3. The horizontal cable manager shall attach to the front or rear of the rack/frame with screws and shall be sized to fit in standard EIA-310-D (1-3/4" high RMU) rack-mount spacing.
 4. The horizontal cable manager shall be sized to match cabling requirements. Provide a minimum of 1 RMU of horizontal cable management for every 2

RMU of connectivity. Cables must be able to access the cable manager so that no ports are blocked by the cables.

5. A single horizontal cable manager may be used to support multiple patch panels as long as it is sized to match cable fill requirements. Cables must be able to access the cable manager so that no ports are blocked by the cables.
6. The horizontal cable manager shall be a single-sided C-shaped trough with a cover. 2 RMU and 3 RMU high cable managers shall have three edge-protected oval openings at the rear to facilitate front-to-rear cabling through the horizontal manager. The front of the cable manager shall have T-shaped cable guides along the top and bottom surfaces of the cable manager. Evenly spaced cable openings in between the T-shaped cable guides shall allow cables to enter/exit the cable manager from/into the rack-mount space. The cover shall be removable, hinged to open up or down and shall snap on to secure the cover in the closed position.
7. The horizontal cable manager shall be delivered individually boxed, and available in the width(s) and height(s) as specified below and in the contract documents.
8. The horizontal cable manager shall be manufactured from steel, aluminum and plastic.
9. Finish shall be epoxy-polyester hybrid powder coat paint to match the communications rack. Edge-protectors, T-shaped cable guides and latch hardware shall be black.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Vertical Cable Managers:

1. Attach vertical cable managers to the side of the rack/frame using the manufacturer's installation instructions and included hardware.
2. When a single vertical cable manager is used in between two racks/frames, attach the vertical cable manager to both racks/frames.
3. When more than one cable manager is used on a rack/frame or group of racks/frames, use the same make, style and size of vertical cable manager on the rack/frame or in between racks/frames.
4. The color of the rack(s)/frame(s) and cable manager(s) must match.
5. Doors shall be attached to the cable manager and in the closed position after cabling is complete.

B. Horizontal Cable Managers:

1. When more than one horizontal cable manager is used on a rack/frame or group of racks/frames, use the same make and style of cable manager on the rack/frame or racks/frames.
2. The color of the rack(s)/frame(s) and cable manager(s) must match.

3. Attach horizontal cable managers to the rack/frame with four screws according to the manufacturer's installation instructions. Each cable manager shall be centered within the allocated rack-mount space (RMU).
4. Horizontal managers shall be located so that the number of ports (cables) that each manager supports shall not exceed each cable manager's cable fill capacity.
5. Covers shall be attached to the cable manager and in the closed position after cabling is complete.

END OF SECTION

SECTION 26 67 47

GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install grounding and bonding for communications systems in accordance with the parameters shown on the drawings and herein specified.
- B. System components shall be Underwriters Laboratories Listed as grounding and bonding equipment.
- C. Systems shall conform with the applicable portions of American National Standards Institute (ANSI), Telecommunications Industry Association (TIA), Electronic Industries Alliance (EIA), Telecommunications Distribution Methods Manual, 14th Edition and Building Industry Consulting Services International (BICSI).
- D. Systems shall conform with the applicable portions of the requirements set forth in the National Electrical Code (NFPA-70, 2023 Edition).

PART 2 – PRODUCTS

2.01 WALL-MOUNT BUSBARS

- A. Telecommunications Main Grounding Busbar (TMGB):
 - 1. Telecommunications Main Grounding Busbar (TMGB) shall be constructed of 0.25" thick solid copper bar.
 - 2. The busbar shall be 4" high and 20" long and shall have 30 attachment points (two rows of 15 each) for two-hole grounding lugs.
 - 3. The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 27 lugs with 5/8" hole centers and 3 lugs with 1" hole centers.
 - 4. The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4" standoff from the wall.
- B. Telecommunications Grounding Busbar (TGB):
 - 1. Telecommunications Grounding Busbar (TGB) shall be constructed of 0.25" thick solid copper bar.
 - 2. The busbar shall be 2" high and 12" long and shall have 9 attachment points (one row) for two-hole grounding lugs.
 - 3. The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 6 lugs with 5/8" hole centers and 3 lugs with 1" hole centers.

4. The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4" standoff from the wall.

2.02 RACK-MOUNT BUSBAR

A. Horizontal Rack Busbar:

1. Horizontal rack-mount busbar shall be constructed of 3/16" thick by 3/4" high hard-drawn electrolytic tough pitch 110 alloy copper bar.
2. Bar shall be 19" EIA or 23" rack mounting width (as specified below) for mounting on relay racks or in cabinets.
3. Bar shall have eight 6-32 tapped ground mounting holes on 1" intervals and four 0.281" holes for the attachment of two-hole grounding lugs.
4. Each bar shall include a copper splice bar of the same material (to transition between adjoining racks) and two each 12-24 x 3/4" copper-plated steel screws and flat washers for attachment to the rack or cabinet.

B. Vertical Rack Busbar:

1. Vertical rack-mount busbar shall be constructed of 1/4" thick by 5/8" high hard-drawn electrolytic tough pitch 110 alloy copper bar.
2. Bar shall be 72" or 36" high (as specified below) for mounting vertically on relay racks.
3. 72" high bar shall have 13 threaded 1/4-20 attachment points for two-hole lugs with 5/8" hole centers and two pairs of threaded studs (one at top, one at bottom) for two-hole lugs with 1" hole centers.
4. 36" high bar shall have 8 threaded 1/4-20 attachment points for two-hole lugs with 5/8" hole centers and one pair of threaded studs for a two-hole lug with 1" hole centers.
5. Each bar shall include a #2 AWG two-hole compression lug for 1" hole centers, insulator blocks and mounting screws.

C. Vertical Rack Ground Bar:

1. Vertical rack-mount ground bar shall be constructed of 0.05" thick by 0.68" wide tinned copper strip.
2. Bar shall be 78" high for mounting vertically on relay racks and shall have holes punched on 5/8"-5/8"-1/2" alternating vertical centers to match the EIA-310-D Universal Hole Pattern for a 45 RMU rack.
3. Each bar shall include three #12-24 zinc-plated thread forming hex washer head installation screws, an abrasive pad and antioxidant joint compound.

2.03 BONDING ACCESSORIES

A. Two Mounting Hole Ground Terminal Block:

1. Ground terminal block shall be made of electroplated tin aluminum extrusion.
 2. Ground terminal block shall accept conductors ranging from #14 AWG through 2/0.
 3. The conductors shall be held in place by two stainless steel set screws.
 4. Ground terminal block shall have two 1/4" holes spaced on 5/8" centers to allow secure two-bolt attachment to the rack or cabinet.
- B. Compression Lugs:
1. Compression lugs shall be manufactured from electroplated tinned copper.
 2. Compression lugs shall have two holes spaced on 5/8" or 1" centers, as stated below, to allow secure two bolt connections to busbars.
 3. Compression lugs shall be sized to fit a specific size conductor, sizes #6 to 4/0, as stated below.
- C. Antioxidant Joint Compound:
1. Oxide inhibiting joint compound for copper-to-copper, aluminum-to-aluminum or aluminum-to-copper connections.
- D. C-Type, Compression Taps:
1. Compression taps shall be manufactured from copper alloy.
 2. Compression taps shall be C-shaped connectors that wrap around two conductors forming an irreversible splice around the conductors; installation requires a hydraulic crimping tool.
 3. Compression taps shall be sized to fit specific size conductors, sizes #2 AWG to 4/0, as stated below.
- E. Pipe Clamp With Grounding Connector:
1. Pipe clamp shall be made from electroplated tinned bronze. Installation hardware will be stainless steel.
 2. Pipe clamp shall be sized to fit up to two conductors ranging in size from #6 to 250 MCM; conductors must be the same size.
 3. Pipe clamp installation hardware shall be sized to attach to pipes, sizes 1" to 6" (0.75" to 6.63" in diameter), as stated below.
- F. Equipment Ground Jumper Kit:
1. Kit includes one 24"L insulated ground jumper with a straight two hole compression lug on one end and an L-shaped two hole compression lug on the other end, two plated installation screws, an abrasive pad and a .5 ounce tube of antioxidant joint compound.

2. Ground conductor is an insulated green/yellow stripe #6 AWG wire.
3. Lugs are made from electroplated tinned copper and have two mounting holes spaces 0.5" to 0.625" apart that accept 1/4" screws.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Wall-Mount Busbars:

1. Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions.
2. Conductor connections to the TMGB or TGB shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
3. Each lug shall be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
4. The wall-mount busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.

B. Rack-Mount Busbars and Ground Bars:

1. When a rack or cabinet supports active equipment or any type of shielded cable or cable termination device requiring a ground connection, add a rack-mount horizontal or vertical busbar or ground bar to the rack or cabinet. The rack-mount busbar or ground bar provides multiple bonding points on the rack for rack and rack-mount equipment.
2. Attach rack-mount busbars and ground bars to racks or cabinets according to the manufacturer's installation instructions.
3. Bond the rack-mount busbar or ground bar to the room's TMGB or TGB with appropriately sized hardware and conductor.

C. Ground Terminal Block:

1. Every rack and cabinet shall be bonded to the TMGB or TGB.
2. Minimum bonding connection to racks and cabinets shall be made with a rack-mount two-hole ground terminal block sized to fit the conductor and rack and installed according to manufacturer recommendations.
3. Remove paint between rack/cabinet and terminal block, clean surface and use antioxidant between the rack and the terminal block to help prevent corrosion at the bond.

D. Pipe Clamp:

1. Bond metal pipes located inside the data center computer room with a minimum #6 AWG conductor to the TMGB or TGB using a pipe clamp sized to

fit the pipe and the conductor and installed according to the manufacturer's recommendations.

2. Remove paint between the pipe and pipe clamp, clean surface and use antioxidant between the pipe and the clamp to help prevent corrosion at the bond.
3. Remove insulation from conductors where wires attach to the pipe clamp.

E. Equipment Ground Jumper Kit:

1. Bond equipment to a vertical rack-mount busbar or groundbar using ground jumper according to the manufacturer's recommendations.
2. Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount busbar or groundbar to help prevent corrosion at the bond.

END OF SECTION

SECTION 26 67 48

COMMUNICATIONS CABLE - COPPER

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install data and voice cable in accordance with the parameters shown on the drawings and herein specified.
- B. Cable shall be the unshielded twisted pair type, Category 6; Underwriters Laboratories listed, ANSI/TIA/EIA compliant; complete with conductors, insulation, ripcord, jacket and identification.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. TE Connectivity, Berk-Tek, or approved equal.

2.02 DESCRIPTION

- A. Conductors (4 pair):
 - 1. Material:
 - a. Copper.
 - 2. Construction:
 - a. Solid, 23 AWG.
- B. Insulation:
 - 1. FEP (fluorinated ethylene propylene).
- C. Jacket:
 - 1. Plenum rated, 100% low smoke, flame-retardant polyvinyl chloride, blue.
 - 2. -20C to 60C.
- D. Identification:
 - 1. Clearly marked (at 2'-0" intervals) size, type, voltage, UL label.
- E. Color coding:
 - 1. Pair No. 1:
 - a. White/blue stripe and blue.
 - 2. Pair No. 2:

- a. White/orange stripe and orange.
- 3. Pair No. 3:
 - a. White/green stripe and green.
- 4. Pair No. 4:
 - a. White/brown stripe and brown.

F. Performance:

- 1. 100 MHZ

Insertion Loss	19.8
Return Loss	20.1
NEXT	44.3
PSNEXT	42.3
ACR	24.5
PSACR	22.5
ACRF (ELFEXT)	27.8
PSACRF (PSELFEXT)	24.8

- 2. 250 MHZ

Insertion Loss	32.8
Return Loss	17.3
NEXT	38.3
PSNEXT	36.3
ACR	5.5
PSACR	3.5
ACRF (ELFEXT)	19.8
PSACRF (PSELFEXT)	16.9

PART 3 – EXECUTION

3.01 ARRANGEMENT

- A. Arrangement shall be consistent with the component locations and riser diagram shown on the drawings.
- B. Precise as-built markups (illustrating actual field arrangements and component configurations) shall be submitted to the Engineer.

3.02 PREPARATION

- A. Cable slack, service loops, bend radii, and pathway fill ratio shall comply with applicable codes and standards.
- B. Metallic horizontal cable pathways shall be bonded to an approved ground.

- C. Cable ends for termination shall be clean and free from crush marks, cuts, or kinks left from pulling operations.

3.03 INSTALLATION

- A. It is the intent of this specification that all cabling shall be the responsibility of this Contractor, including all terminations and cable system testing.
- B. Concealed cable within partitions and penetrations through partitions or floors shall be installed in dedicated electrical metallic tubing with set screw type couplings and connectors.
- C. Terminate cables into the patch panel according to manufacturer's instructions.
- D. To maximize transmission performance, maintain wiring pair twists as close as possible to the point of termination.
- E. The length of wiring pair un-twist in each termination shall be less than 0.5 inches (13 mm).
- F. Horizontal or backbone cables extending from the panel terminations shall maintain a minimum bend radius of at least 4 times the cable diameter.
- G. Cable terminations shall have no tensile or bending strain on panel IDC contacts in each installed location.
- H. For horizontal cabling, jacks shall be terminated with faceplates assembled complete and properly mounted.
- I. Panels shall be properly labeled on front and back with the cable number and port connections for each port.

3.04 FIELD QUALITY CONTROL – TESTING

- A. Panels shall be tested as part of the installed horizontal or backbone cabling system.
- B. Each link or channel in the horizontal or backbone cabling system shall be identified and tested individually, using an industry standard level III tester with proper settings, including the correct cable NVP value.
- C. Each backbone or horizontal link/channel shall be tested to Category 6 parameters listed in the table below. (Note: a level III tester will produce all results below automatically)

Wire Map / Continuity	Length	Insertion Loss
NEXT	PSNEXT	ELFEXT
PSELFEXT	Delay and Delay Skew	Return Loss

- D. A "PASS" indication shall be obtained for each channel or link, using a level III tester.

- E. Completed test reports shall be submitted to the architect, engineer, and owner

3.05 LABELING

- A. All backbone cables are to be labeled using a machine printed label at each end of the cable at approximately 12 inches of the termination point, and again at approximately 48 inches from the termination point. Handwritten labels shall not be used.
- B. All wiring blocks, connector panels, or other termination points shall be labeled with the cable identifier as well as the pair or conductor identifier.
- C. The labels shall denote, at a minimum, the starting and end points of the cable, as well as a unique cable identifier, i.e. FTO-A.FTO-B-1.
- D. Note all labeling information on the as-built drawings.

END OF SECTION

SECTION 26 67 49

STRUT MOUNT CONTINUOUS CABLE SUPPORT SYSTEM

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install strut mount continuous cable support system in accordance with the parameters shown on the drawings and herein specified.
- B. System shall include u-hooks, double j-hooks, swivel brackets, rollers, wire retainers, protection tubes, wall brackets, threaded rods, etc. and all accessories necessary for a complete system.
- C. Systems shall conform with the applicable portions of American National Standards Institute (ANSI), Telecommunications Industry Association (TIA), Electronic Industries Alliance (EIA), Telecommunications Distribution Methods Manual, 14th Edition and Building Industry Consulting Services International (BICSI).
- D. Systems shall conform with the applicable portions of the requirements set forth in the National Electrical Code (NFPA-70, 2023 Edition).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. NVENT Caddy CAT-CM Cable Support System, or approved equal.

2.02 DESCRIPTION

- A. Strut Mount Continuous Cable Support System U-hooks (CAT200CMLN):
 - 1. U-hooks shall be electrogalvanized steel.
 - 2. The system shall offer optional rollers and retainers for use on U-hooks to retain cables and support cable pulls.
 - 3. U-hooks shall have a pre-assembled quick attachment nut for mounting to half-slot strut.
 - 4. U-hooks shall be able to utilize readily available half-slot strut.
 - 5. U-hooks shall allow for customized support spacing.
 - 6. Shall have steel transition pieces for elevation and directional changes.
 - 7. Shall have protective tubes for threaded rod to eliminate scraping and cutting of cable sheath during pulling.
 - 8. U-hooks shall be compliant with NEC and ANSI/TIA structured cabling systems standards.

- B. Strut Mount Continuous Cable Support System Double J-hook (CAT100CM):
 - 1. Double J-hooks shall be electrogalvanized steel.
 - 2. The system shall offer retainers for use on Double J-hooks to retain cables.
 - 3. Double J-hooks shall be able to utilize readily available half-slot strut.
 - 4. Double J-hooks shall allow for customized support spacing.
 - 5. Double J-hooks shall be compliant with NEC and ANSI/TIA structured cabling systems standards.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. System shall be installed per manufacturer's installation instructions.
- B. Attach to support structure or sub structure using threaded rods placed at a maximum distance of 5' apart. Installer is responsible for the integrity of the structures to which the system is attached, including their capability of safely accepting the loads imposed as evaluated by a qualified engineer.
- C. Support pathway from building support structure or sub structure. Do not support pathway from ductwork, piping, or other equipment hangers.
- D. Coordinate all pathway runs with other trades prior to installation.
- E. All pathways shall be installed a minimum of 12 in. away from any light fixture or other source of EMI (Electro-magnetic interference).
- F. Horizontal pathways shall be sized for a minimum of 50% future growth.
- G. Load Strut Mount U-hooks evenly.
- H. Install cables using techniques, practices, and methods that are consistent with cable manufacturer's recommendations.

END OF SECTION

SECTION 26 69 41

WIRELESS LIGHTING SYSTEMS CONTROLS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install wireless lighting systems controls in accordance with the parameters shown on the drawings and herein specified.
- B. Systems shall be the modular, microprocessor based type; networked for single point programming and information sharing; Underwriters Laboratories listed, Federal Communications Commission compliant; complete with preassembled dimming and switching panels, low voltage wallstations, control interfaces, solid state high frequency fluorescent dimming ballasts, software and all necessary accessories.
- C. Refer to Section 266010, General Provisions, for requirements relative to submittals, accessories and components, installation, removals, protection, maintenance manual, systems demonstration and instruction; additionally, Section 266111, Conduit Systems, and Section 266120, Wire and Cables, shall apply.

1.02 SOURCE AND SERVICE

- A. Source:
 - 1. Basic systems components and associated accessories shall be furnished by a single manufacturer through a factory authorized distributor.
- B. Service:
 - 1. Systems service shall be available from the manufacturer's authorized distributor within a 100 mile radius, 24 hours of every day via qualified factory trained technicians.

1.03 GUARANTEE

- A. The system shall be guaranteed to be free from defects in materials and workmanship for a period of 5 years from the date of final acceptance by the Owner, during which time all above mentioned defects shall be corrected and all services incidental to proper performance shall be provided free of charge.

1.04 FABRICATION DRAWINGS, MATERIAL LISTS AND EQUIPMENT SUBMITTALS

- A. Descriptive literature for system components.
- B. Material lists for system distribution (wire, cables, boxes, support, etc.).
- C. One-line diagram, including panelboard interface.
- D. Wiring diagrams for component connections.
- E. Sequence of operation.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Cooper Lighting Solutions (Wavelinx Pro), or approved equal.

2.02 OPERATION

- A. The wireless lighting control system shall offer the following features:
 - 1. Continuous dimming and automatic on/off controls.
 - 2. Indoor and outdoor occupancy control.
 - 3. Indoor and outdoor vacancy control.
 - 4. Indoor and outdoor daylight harvesting.
 - 5. Outdoor load control.
 - 6. Receptacle control.
 - 7. Load management.
 - 8. Multi-level scene control.
 - 9. 7-Days scheduling.
 - 10. Astronomic scheduling.
 - 11. Demand response.
 - 12. Task Tuning.
 - 13. Manual control via wall stations or software apps.
 - 14. Energy usage data reporting (up to 13 months).
 - 15. Occupancy data reporting (up to 13 months).
 - 16. Automatic Energy Code Compliance.
 - 17. Configuration and management via mobile device for standalone area controller.
 - 18. Configuration and management via a mobile device and web pages for connected area controller.
 - 19. Integration with third-party systems via BACnet/IP and Public (REST) API.
 - 20. System health monitoring.
- B. Capable of continuous dimming and switching, allowing each fixture to monitor its local environment and provide distributed control in response to environmental changes.

- C. Provide out-of-the-box functionality of all light fixtures with integrated sensors providing occupancy automatic on to 75% light level and automatic off after 20 minutes. Systems that do not include out-of-the-box functionality shall not be acceptable.
- D. Provide a method for the installer to verify wireless communications and address all wireless devices with a single push button. Systems that require device addressing using a manual data entry method through software shall not be acceptable.
- E. Provide a visible indication on all wireless devices as each wireless device joins the wireless network. Systems that do not provide a visual indicator per device to the installer shall not be acceptable.
- F. Provide the capabilities for the installer to create a construction group of all wireless occupancy sensors and wireless wall stations to control all installed wireless light fixtures.
- G. Programmed entirely and configured using a mobile application. Systems that require web or pc software for configuration shall not be acceptable.
- H. Allow addressed wireless light fixtures with integrated sensors to be identified (reverse-identified) by the sensor with a laser, flashlight, IR remote, etc. Identified light fixtures shall provide visible indication on the mobile application. Systems that do not permit reverse identification methods shall not be acceptable.
- I. Allow wireless wall stations, receptacles, wireless switchpack with 0-10V dimming to be identified (reverse-identified) by a simple pushbutton method on each device. Identified devices shall provide visible identification on the mobile application. Systems that do not permit reverse identification methods shall not be acceptable.
- J. Support standalone and networked topologies. The Wireless Area Controllers shall not be connected to an IP network in a standalone topology. The user shall program the standalone area controller via a mobile app. In a network topology, the Wireless Area Controllers are connected to an IP network and bi-directionally communicate with a supervisory system.
- K. Provide the energy usage, occupancy status, scene status and daylight information for all controlled spaces.
- L. Includes the following components:
 - 1. Wireless indoor ambient integrated sensors shall consist of a passive infrared sensor, digital photocell, microprocessor, a wireless radio (IEEE 802.15.4), a Bluetooth radio for real-time location services (RTLS) and a load controller for ON/OFF/DIM.
 - 2. Wireless industrial integrated sensors shall include a passive infrared sensor, digital photocell, microprocessor, a wireless radio (IEEE 802.15.4), a load controller for ON/OFF/DIM, and be field installed/replaced via an industry-standard socket.
 - 3. Wireless outdoor integrated sensors shall include a passive infrared sensor, digital photocell, microprocessor, a wireless radio (IEEE 802.15.4), a load controller for ON/OFF/DIM, and be field installed/replaced via an industry-standard socket.

4. Relay switchpack with 0-10V control shall contain commercial-grade power metering and a latching relay to control 20-amp load and 120mA 0-10V sink, shall include LED indication and pushbutton for device override and identification.
5. Contact Closure Input device shall be capable of providing a wired low-voltage input to the system with two (2) possible output results:
 - a. Connectivity to a wired low-voltage sensor or sensors up to 40mA:
 - 1) Shall be capable of Passive Infrared (PIR) and multi-tech (PIR + ultrasonic).
 - 2) Shall be commissioned for occupancy or vacancy behavior.
 - b. Connectivity to a maintained dry contact closure input:
 - 1) Shall be commissioned to drive a scene for the included area.
6. Tilemount sensor kit shall include a digital photocell, microprocessor, a wireless radio (IEEE 802.15.4), a Bluetooth radio for RTLS services and a load controller for ON/OFF/DIM, capable of installation in indoor ceiling tile applications, and standard junction boxes.
 - a. Wall station shall be mains powered (120-277VAC) with numerous button configurations, supporting small and large engraved buttons, LED indication, universal light icon with raise/lower buttons, each button fully programmable for Area Scene or Zone control, wireless radio (IEEE 802.15.4).
7. Low-Voltage Power modules to power:
 - a. 12 X 100W (90W MAX) Class 2 outputs to connect low-voltage luminaries.
 - b. Addressable digital communications.
 - c. Integrated Class 1 wiring compartments for normal and emergency circuit wiring for centralized UL924 input.
 - d. Two (2) low-voltage output circuits for emergency output (emergency lighting).
 - e. Daisy-chain wiring (up to 90W per output) with individually addressable low-voltage luminaries.
 - f. Contact closure input for higher priority system override.
 - g. Plenum-rated and passively cooled.
 - h. IP communications to the area controller.
8. Touchscreen:
 - a. Send up to sixteen (16) pre-configured scene commands to an area.

- b. Change the light level of a lighting zone or zones within an area.
 - c. PoE powered and IP communications to the area controller.
 - d. Change the color temperature of space via the associated correlated color temperature zone.
9. Wireless Area Controllers shall support the following features:
- a. Wirelessly communicate (IEEE 802.15.4) with wireless sensors, wireless wall stations, wireless relays, and wireless receptacles to coordinate control areas and zones.
 - b. Wired communications through network switch to touchscreen interface to coordinate control areas and zones.
 - c. Power over Ethernet port to power the Wireless Area Controller and allow the connection of a Wireless Area Controller to a local area network (LAN).
 - d. 802.11 radio acting as a WiFi-AP, allowing a mobile device to connect to the Wireless Area Controller to the program lighting system.
 - e. 802.11 radio acts as a wireless gateway allowing a mobile application or a supervisory system to communicate with the Wireless Area Controller via a wireless local area controller.
 - f. Up to 50 areas.
 - g. Up to 200 total zones per Wireless Area Controller.
 - h. Up to 16 scene configurations per area.
 - i. Up to 100 occupancy sets per Wireless Area Controller.
 - j. Multiple daylight sets per area.
 - k. Demand Response reduction values.
 - l. Scheduling configuration.
 - m. System backup and restore capabilities.
 - n. Automatic Code Commissioning.
 - o. Built-in astronomical clock.
10. The Mobile application shall communicate using Wi-Fi to a single Wireless Area Controller or a building IT network with multiple Wireless Area Controllers. The Mobile application shall include the following features:
- a. Ability to connect to multiple Wireless Area Controllers.
 - b. Administrative and user login credentials.
 - c. Modes for both demonstration and live use.

- d. Automatic Code Commissioning.
 - e. Drag and drop or multi-select programming of wireless lighting system.
11. The supervisory system shall allow users to monitor and control the lighting system from the central human-machine interface (HMI) and integrate with the third-party system via standard based interfaces. The supervisory system shall include the following features:
- a. Ability to discover and connect to multiple Wireless Area Controllers.
 - b. Aggregate data from the Wireless Area Controllers.
 - c. Display the health data, i.e. devices faults notifications and other system notifications on a web-based HMI application.
 - d. Building editor allowing users to create their building hierarchy (campus, building, floors, areas, zones, devices) as well as floor plans for each floor.
 - e. View areas/zones and devices on a floor plan and their status (ON/OFF/DIM and Override).
 - f. Provide troubleshooting tips for each detected fault to allow the individuals responsible for maintaining and efficiently troubleshooting the system.
 - g. Display the energy usage of the lighting system, including controlled receptacles.
 - h. Expose the data aggregated from the networked Wireless Area Controllers to a third-party system via BACnet/IP and Public (REST) API.
 - i. Receive automatic demand response signal for load shedding from third-party system via OpenADR, BACnet/IP and Public (REST) API and broadcast it to the connected Wireless Area Controllers.
 - 1) The OpenADR interface shall be listed in the OpenADR certified product database.
 - j. Send manual actions/overrides.
 - k. Create/Manage lighting systems schedules.
 - l. Create/Manage user accounts and user roles and associate areas to each user.
 - m. Provide from deployed sensor network Real-Time Location Services (RTLS) information with "Room Level" accuracy.
 - 1) This may require and additional software license charge and trackable devices.
 - n. Manage the supervisory systems software upgrades as well as Wireless Area Controllers.
 - o. Backup/restore the Supervisory System (OS, application and database).

12. The supervisory system shall host applications that use the data gathered by the sensors to improve business processes. The applications shall provide the following benefits:
 - a. Locate equipment and personnel based on the BLE signals emitted by the BLE tags/badges associated with the equipment/personnel and received by the wireless integrated sensor and ceiling tile mounted sensors.
 - b. Provide insights about space usage based on occupancy data.
 - c. These applications shall be pre-installed on the supervisory server and require an additional software license.

2.03 LIGHTING CONTROL APPLICATIONS

- A. Occupancy/vacancy requirements – provide an occupancy/vacancy sensor with manual on/automatic off or automatic on/automatic off functionality in all spaces for up to 13 months. Manual vacancy sensors should be used for an enclosed space with a manual-on switch that does not require a hands-free operation. Spaces with multiple occupants or where line of sight might be obscured, ceiling or corner mount sensors and manual wall stations would be required. Automatic on of lighting via occupancy sensor cannot exceed 50% of lighting. Systems that allow the user to select occupancy or vacancy mode shall not be acceptable.
- B. Provide variable dimming for maximum energy savings.
- D. Daylight zones – primary side-lit or top-lit areas within an enclosed space shall be controlled separately and automatically by individual integrated daylight sensors. Adjustments to the daylight zones must be provided by a simple to use, intuitive mobile application.
- E. Provide smooth and continuous daylight dimming for areas marked on drawings. Daylighting control system may be designed to dim electric light to the lowest light level and off.
- F. Provide the ability to adjust the high-end and low-end trim of the dimmers to ensure the lighting automatically provides energy-saving even when daylighting calls for full illumination.
- G. Provide the ability for the dimmers and the relays to function separately. Systems where the 0-10v dimmers and relays are tied together reduce design capabilities and shall not be acceptable.
- H. Capable of automatically responding to a demand response signal and adjusting the lighting level without programming or software. Systems that require software or commissioning to provide demand response integration shall not be acceptable.
- I. Additional controls:
 1. Provide occupancy or vacancy sensors (Auto On or Manual On) for any enclosed office, conference, meeting or training rooms. Spaces with multiple occupants or where line of sight may be obscured require ceiling or wall/corner-mounted sensors with Manual On switches.

2. Conference, meeting, training, auditoriums and multi-purpose rooms shall have controls that allow for scene-based and independent control of each output. Rooms larger than 300 square feet shall support at minimum four (4) pre-set lighting scenes. Occupancy or vacancy sensors shall control all luminaries and receptacles.
3. Egress lighting control shall be integral to the system. The system shall automatically control adjacent corridor and/or egress lighting based upon room occupancy. Systems that do not ensure that adjacent corridor and/or egress lighting is controlled with room occupancy shall not be acceptable.
4. Able to communicate with a third-party system such as a building automation system through native BACnet/IP communications hosted on the supervisory system. The supervisory system shall be on the same subnet as the third-party system.
5. Able to communicate with third-party systems such as IoT platforms or AV systems by means of restful API commands via the public API interface hosted on the supervisory system. The supervisory system shall communicate to the third system via the IP network provided by the customer through the proper ports.

2.04 CYBERSECURITY

- A. The IP network connectable products within the Wireless Lighting Control system shall comply with the IEC 62443-4-2 cybersecurity standard. A letter of compliance by an IEC authorized certification lab shall be provided for all IP connectable products. Self-certification to the standard shall not be accepted.

2.05 CONNECTED DEVICES

- A. Load control devices:
 1. Relay Switchpack with 0-10V Dimming:
 - a. Plenum-rated
 - b. Integrated, self-contained unit consisting internally of an isolated load switching control relay [and a power supply to provide low-voltage power].
 - c. 20AMP 120/277/347VAC General Purpose.
 - d. 16AMP 120/277/347VAC electronic ballast (LED load).
 - e. Single class 2 0-10V dimming output (IEC 60929 Annex E) sinks up to 120mA per (40µA max per circuit leakage to line).
 - f. 0-10V output supports up to 60 ballasts/drivers that draw a standard 2mA each.
 - g. Calculated energy consumption data available through Trellix.
 - h. Compatible with electronic ballast, LED, incandescent, magnetic or electronic low-voltage, and magnetic or electronic fluorescent, as well as motor loads.

- i. Capable of controlling up to 20-amp receptacle or plug loads.
 - j. Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - k. FCC certified.
 - l. Class 1 device.
 - m. WaveLinux Pro model WSP-UV-010.
3. Universal Dimming Switchpack with Dry Contact Closure:
- a. Plenum-rated.
 - b. Integrated, self-contained unit consisting internally of an isolated load switching control relay [and a power supply to provide low-voltage power].
 - c. 20amp 347VAC General Purpose.
 - d. 16amp 347VAC electronic ballast (LED load).
 - e. Single class 2 0-10V dimming output (IEC 60929 Annex E) sinks up to 30mA.
 - f. 0-10V output supports up to 30 ballasts/drivers that draw.
 - g. Calculated energy consumption data based on maximum connected power available through Trellix.
 - h. Compatible with electronic ballast, LED, incandescent, magnetic or electronic low-voltage, and magnetic or electronic fluorescent, as well as motor loads.
 - i. Capable of controlling up to 20 amp receptacle or plug loads.
 - j. Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - k. FCC certified.
 - l. Class 1 device.
 - m. Contact Closure input capable of wired low-voltage sensor or maintained contact closure interface.
 - n. WaveLinux Pro model WSP-CA-010.
4. Control Module:
- a. Calculated energy consumption data based on maximum connected power available through Trellix for up to 13 months.

- b. Controller to include latching relay to decrease power requirements of the power pack.
 - c. Operate Bounce Time: 3 milli-seconds (MAX).
 - d. Max Switching Voltage 277VAC and 125VDC.
 - e. Class B and Class F insulation rating.
 - f. Operations:
 - 1) Control Module and Sensor shall communicate energy usage Wireless Area Controller.
 - g. Listed to UL916.
 - h. FCC Part 15 Class A certified.
 - i. Manufacturer to a pre-wire control module in the Fixture.
 - j. Plenum rated.
 - k. The connection between sensors and control module shall be Class 2, 18-24 AWG, stranded or solid depending on the UL Classified, PVC insulated or TEFLON jacketed cable suitable for plenums.
5. Low-Voltage Power Module:
- a. 12 X 100W to power and control up to 64 addressable low-voltage luminaries.
 - b. Ethernet connectivity to a Wireless Area Controller.
 - c. Support normal and emergency power inputs with two (2) EM outputs.
 - d. ALERT dry contact closure input drives all connected low-voltage luminaries immediately to 100%.
 - e. Passively cooled and plenum rated design for above-ceiling installation.
 - f. cUL listed.
 - g. UL 2108 certified
6. Outdoor Load Control:
- a. Power failure memory:
 - 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - b. Control Wireless Reporting:
 - 1) Load status.

- c. Turn ON/OFF/DIM connected outdoor luminaire based on wireless communications signal from the Wireless Area Controller.
- d. Control the Outdoor load controller using Time Schedule, Astronomic schedule or a Manual pushbutton from a connected wall station.
- e. Wirelessly transmit; light level power to the Wireless Area Controller, which allows the data to be stored in a central location on-premises and displayed via the Mobile Application.
- f. Remotely adjustable settings for dimming and time-based.
- g. Have the ability to remotely adjust the light output and remain as-is for an adjustable period before turning off when a space is vacant.
- h. Default programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently from Wireless Area Controller, so single-point failure cannot be. Systems must operate so there is no single point of failure.
- i. WaveLinx Pro model WOLC.

B. User Interfaces:

1. Product: WaveLinx Pro Line-Voltage Wall Station [W1L-*], [W1L-RL-*], [W2L-*], [W2L-RL-*], [W3L-*], [W2S-*], [W2S-RL-*], [W4S-*], [W4S-RL-*], [W5S-*], [W6S-*]
 - a. Mains powered wireless wall station providing multi-level control of an area or zone.
 - b. 120-1277VAC input.
 - c. Provide individual button LED indication of status and wireless communication and selected button.
 - d. Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - e. FCC certified.
 - f. Class 1 device.
 - g. Wireless momentary pushbutton switches in 2, 3, 4, 5 and 6 button configurations; available in white, ivory, grey, black; compatible with wall plates with decorator opening. Line-Voltage Wall stations shall include the following features:
 - 1) Multi-level selection
 - 2) Scene raise/lower
 - 3) Toggle ON/OFF
 - 4) Removable buttons for field replacement with engraved buttons and/or alternate color buttons [ENGRV-*BTNL-*], (ENGRV-BTNS*).

Button replacement may be completed without removing the switch from the wall.

- 5) Intuitive button labeling to match application and load controls.
- 6) Pre-defined digital button configurations. Each wall station is shipped with pre-defined digital button configurations, automatically mapped to specific area/zone controls when added to an area in the Mobile Application.
- h. Multiple wall stations may be installed in an area by simply connecting them to the network. No additional configuration will be required to achieve multi-way switching.
- i. Line-Voltage Wall Stations are delivered with pre-defined functions including raise, lower, Half lights, Full lights, Read, Relax, Dimmed, Night, manual and scene control.
- j. Line-Voltage Wall Stations may also be delivered with field programmable generic labeled buttons such as Scene 1, Scene 2, etc.
- k. Optional custom labelling is available for application or location-specific wall station button fields.

C. Connected Sensors

1. Ceiling Sensor:

- a. Occupancy Sensing:
 - 1) PIR multiple-segmented lens, with internal grooves to eliminate dust and residue build up.
 - 2) Products tested in identical manner, compliant to NEMA WD 7 – 2011.
 - 3) Occupancy Motion Sensor Standards have time delays from 10 to 20 min.
 - 4) Battery life shall be ten years based on approximately 30 activations and wireless signals per day.
- b. Daylight Sensing:
 - 1) Open-loop daylight sensor.
 - 2) 100 – 900lux.
 - 3) Light input within 60° cone.
- c. Power Failure Memory:
 - 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - 2) Battery powered by two (2) AA standard alkaline batteries.

- d. Sensor Wireless Reporting:
 - 1) Battery life through the Mobile Application.
 - 2) Occupancy status.
 - 3) Ambient light level.
 - e. Provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
 - f. Wirelessly transmit occupancy, light level, power to the Wireless Area Controller, which allows the data to be stored in a central location on-premises and displayed via the Mobile Application and Trellix software.
 - g. Fully adaptive with the ability to have the sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
 - h. Remotely adjustable settings for dimming levels, occupied/unoccupied light levels, occupancy/vacancy sensing, and sensitivity to changes in motion and changes in ambient light levels.
 - i. Remotely adjust the light output to reduced levels and remain at the reduced level for an adjustable period before turning off when the space is unoccupied.
 - j. Programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently from the Wireless Area Controller, so single-point failure cannot be. Systems must operate so there is no single point of failure.
 - k. WaveLinx Pro model CWPD-1500.
2. WaveLinx Pro Integrated Sensor (WAA)
- a. Sensing mechanism:
 - 1) [Infrared]: Utilize multiple-segmented lens with internal grooves to eliminate duct and residue build-up.
 - 2) [Daylight]: Utilize integrated daylight sensor to provide closed-loop daylight dimming control. Each integrated Sensor an individual daylight dimming zone to provide highly accurate daylight levels at the work surface throughout the entire space.
 - 3) [Location]: Utilize additional internal Bluetooth radio capable of offering Real-Time Location Services (RTLS) – IoT Software Upgrade Required.
 - b. Power failure memory:
 - 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.

- c. Products tested in identical manner, compliant to NEMA WD 7 – 2011 Occupancy Motion Sensors Standards.
- d. Time delays from 10 to 20 min.
- e. Unique daylight calibration considering the light level at the sensors, work surface and integrated luminaire light output.
- f. Provide an LED as a visual means of indication to verify that motion is being detected during both testing and normal operation.
 - 1) Green LED indication when the sensor is in out-of-the-box operation mode.
 - 2) White LED indication when the sensor has been connected to the lighting control system.
- g. Test mode – fifteen second time delay.
- h. Walk-through mode.
- i. RoHS compliant.
- j. Provide out-of-the-box functionality of occupancy detection, directly controlling integrated fixture.
 - 1) The occupied default light level is 75%.
 - 2) The unoccupied default light level is OFF.
 - 3) The occupancy default time out is 20 minutes.
- k. Monitor changes in occupancy changes in ambient light levels and communicate digital control commands to light fixtures according to a control strategy.
- l. Wirelessly transmit occupancy status and light level to the Wireless Area Controller, which allows the data to be stored in a central location on-premises and displayed via the Mobile Application and Trellix software.
- m. Calculated energy consumption data available through Trellix.
- n. Fully adaptive with the ability to have sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
- o. Remotely adjustable settings for dimming levels, occupied/unoccupied light levels, occupancy/vacancy sensing, and sensitivity to changes in motion and changes in ambient light levels.
- p. Remotely adjust the light output to reduced levels and remain at the reduced level for an adjustable period before turning off when a space is vacant.
- q. Default programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently from Wireless Area

Controller, so single-point failure cannot be. Systems must operate so there is no single point of failure.

r. WaveLinx Pro model WAA.

3. WaveLinx Pro Tilemount Sensor Kit (WTA)

a. Sensing Mechanism:

- 1) [Infrared]: Utilize multiple-segmented lens with internal grooves to eliminate dust and residue build-up.
- 2) [Daylight]: Utilize integrated daylight sensor to provide closed-loop daylight dimming control. Each integrated Sensor provides an individual daylight dimming zone to provide highly accurate daylight levels at the work surface throughout the entire space.
- 3) [Location]: Utilize additional internal Bluetooth radio capable of offering Real-Time Location Services (RTLS) – IoT Software Upgrade Required.

b. Power failure memory:

- 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.

c. Connects to a control module which supports up to 3 amps of connected fixtures.

d. Designed to be installed in a ½" or ¾" ceiling tile within 54" (137cm) of the control module and connected fixtures.

e. Provide unique daylight calibration considering the light level at the sensors, work surface and integrated luminaire light output.

f. Provide an LED as a visual means of indication and diagnostics.

g. RoHS compliant.

h. Control Module:

- 1) Connect to a 0-10V dimmable ballast or driver via a control module or connect to an enabled driver without using the control module.
- 2) Connect to a controller via a low-voltage cable for interior applications.
- 3) If power dropouts in the event of a brown-out or black-out, when power is restored, the lighting system should recover quickly and automatically return to the last lighting levels. A momentary interruption (1 or 2 seconds) of power should not cause extended periods (20 seconds or more) without lighting while the system reboots and all other electrical equipment is back on.

- 4) The luminaire manufacturer shall install the Control Module within the luminaire before shipping it.
 - i. FCC certified.
 - j. Class 2 device.
 - k. User-initiated manual demand response and utility, or BMS initiated automatic demand response.
4. Industrial Integrated Sensor:
- a. Sensing mechanism:
 - 1) [Infrared]: Utilize multiple-segmented lens with internal grooves to eliminate dust and residue build-up.
 - 2) [Daylight]: Utilize integrated daylight sensor to provide closed-loop daylight dimming control. Each integrated Sensor provides an individual daylight dimming zone to provide highly accurate daylight levels at the work surface throughout the entire space.
 - b. Power failure memory:
 - 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - c. Products tested in identical manner, compliant to NEMA WD 7 – 2011 Occupancy Motion Sensors Standards.
 - d. Time delays from 10 to 20 min.
 - e. Provide unique daylight calibration considering the light level at the sensors, work surface and integrated luminaire light output.
 - f. Provide an LED as a visual means of indication to verify that motion is being detected during both testing and normal operations.
 - 1) Green LED indication when the sensor is in out-of-the-box operation mode.
 - 2) White LED indication when the sensor has been connected to the lighting control system.
 - g. Test mode – fifteen second time delay.
 - h. Walk-through mode.
 - i. RoHS compliant.
 - j. Provide out-of-the-box functionality of occupancy detection, directly controlling integrated fixture.
 - 1) The occupied default light level is 100%.
 - 2) The unoccupied default light level is 10%

- 3) The occupancy default time out is 20 minutes
 - k. Monitor changes in occupancy, changes in ambient light levels and communicate digital control commands to light fixtures according to a control strategy.
 - l. Wirelessly transmit occupancy status and light level to the Wireless Area Controller, which allows the data to be stored in a central location on-premises and displayed via the Mobile Application and Trellix software.
 - m. Calculated energy consumption data available through Trellix.
 - n. Fully adaptive with the ability to have the sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
 - o. Remotely adjustable settings for dimming levels, occupied/unoccupied light levels, occupancy/vacancy sensing, and sensitivity to changes in motion and changes in ambient light levels.
 - p. Remotely adjust the light output to reduced levels and remain at the reduced level for an adjustable period before turning off when a space is vacant.
 - q. Default programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently from Wireless Area Controllers, so single-point failure cannot be. Systems must operate so there is no single point of failure.
 - r. WaveLinx Pro model SWPD2, SWPD3.
5. Outdoor Integrated Sensor:
 - a. Sensing mechanism:
 - 1) [Infrared]: Utilize multiple-segmented lens with internal grooves to eliminate dust and residue build-up.
 - 2) [Daylight]: Utilize integrated daylight sensor to provide closed-loop daylight dimming control. Each Integrated Sensor provides an individual daylight dimming zone to provide highly accurate daylight levels at the work surface throughout the entire space.
 - b. Power failure memory:
 - 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
 - c. Products tested in identical manner, compliant to NEMA WD 7-2011 Occupancy Motion Sensors Standards.
 - d. Have time delays from 10 to 20 min.
 - e. Provide unique daylight calibration considering the light levels at the sensors, work surface and integrated luminaire light output.

- f. Provide an LED as a visual means of indication to verify that motion is being detected during both testing and normal operation.
 - 1) Green LED indication when the sensor is in out-of-the-box operation mode.
 - 2) White LED indication when the sensor has been connected to the lighting control system.
 - g. Test mode – fifteen second time delay.
 - h. Walk through mode.
 - i. RoHS compliant.
 - j. Provide out-of-the-box functionality of occupancy detection, directly controlling integrated fixture:
 - 1) On at dusk / Off at dawn.
 - 2) The occupied default light level is 100%.
 - 3) The unoccupied default light level is 50%.
 - 4) The occupancy default time out is 15 minutes.
 - k. Monitor changes in occupancy changes in ambient light levels and communicate digital control commands to light fixtures according to a control strategy.
 - l. Wirelessly transmit occupancy status and light level to the Wireless Area Controller, which allows the data to be stored in a central location on-premises and displayed via the Mobile Application and Trellix software.
 - m. Calculated energy consumption data available through Trellix.
 - n. Fully adaptive with the ability to have the sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
 - o. Remotely adjustable settings for dimming levels, occupied/unoccupied light levels, occupancy/vacancy sensing, and sensitivity to changes in motion and changes in ambient light levels.
 - p. Remotely adjust the output to reduced levels and remain at that reduced level for an adjustable period before turning off when a space is vacant.
 - q. Default programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently from Wireless Area Controller, so single-point failure cannot be. Systems must operate so there is no single point of failure.
 - r. WaveLinx Pro Model SWPD4, SWPD5
6. Pro Outdoor Load Controller:

- a. Sensing mechanism:
 - 1) [Daylight]: Utilize integrated daylight sensor to provide open-loop daylight dimming control. Each Outdoor Load Controller provides an individual daylight dimming zone to provide highly accurate daylight levels.
- b. Power failure memory:
 - 1) Controls incorporate non-volatile memory. Settings and parameters saved in protected memory shall not be lost should power be interrupted and subsequently restored.
- c. RoHS compliant.
- d. Provide out-of-the-box functionality of daylight detection, directly controlling integrated fixture.
 - 1) On at dusk / Off at dawn
- e. Monitor changes in ambient light levels and communicate digital control commands to light fixtures according to a control strategy.
- f. Wirelessly transmit light level to the Wireless Area Controller, which allows the data to be stored in a central location on-premises and displayed via the Mobile Application and Trellix software.
- g. Calculated energy consumption data available through Trellix.
- h. Fully adaptive with the ability to have the sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
- i. Remotely adjustable settings for dimming levels and changes in ambient light levels.
- j. Remotely adjust the light output to reduced levels.
- k. Default programming is stored in each sensor in addition to the Wireless Area Controller. Sensors operate independently from Wireless Area Controller, so single-point failure is not possible./
- l. WaveLinx Pro model WOLC.

2.06 CONTROLLERS AND SUPERVISORY APPLIANCE

- A. Wireless Area Controller:
 - 1. A server-class gateway that allows users to discover, program and manage connected devices, connected sensors and connected Apps.
 - 2. Power source: standardized Power over Ethernet (IEEE802.3af) input, enables building PoE network switches (by others) or a PoE injector (WPOE2-120) (accessory by Cooper Lighting Solutions) for power and network connection.
 - 3. Maximum Ethernet (CAT5 or better) cable distance between the Wireless Area Controller and a network PoE switch is 328 feet (100 meters). Care shall be

taken when routing the cable not to exceed the 328 feet (100 meters) limitation, including travel distance up and down structures.

4. The Wi-Fi access point allows users to use the Mobile App to program the system.
 - a. The user shall be able to disable/enable the Wi-Fi access point.
5. 2.4 GHz Transceiver for IEEE 802.15.4 wireless radio to connect devices and sensors.
6. Support AES 128-bit encryption.
7. Use industry standard HTTPS security with AES-128 encryption safeguards the entire system's integrity.
8. LED indicators for the status of various wireless radios and communications.
9. FCC Part 15 Class A, RoHS certified.
10. Wireless Area Controller connection cables shall be plenum rated.
11. Class 2 devices.
12. UL-900 or IEC62443-4-2 certified by an authorized lab. Self-certification will not be accepted.
13. Spaces defined within the area controller shall be equipped with a control device to shut off lighting in those areas automatically. This automatic control device shall function on either:
 - a. A timeclock scheduling basis where the interior and exterior lights controlled by the Wireless Area Controller are changed based on the time of day or the astronomic (sunrise and sunset).
 - 1) The astronomical time clock shall be integrated into the Wireless Area Controller and shall not require any internet connection to maintain its time.
 - 2) After a power loss, the timeclock programming and time clock settings shall be retained.
 - 3) The time clock shall allow weekly recurrences.
 - 4) Time clock events can be scheduled to:
 - (1) Set areas to desired scenes.
 - (2) Zone light levels to the desired light level.
 - (3) Zone light levels when occupied.
 - (4) Zone light levels when unoccupied
 - b. An occupancy basis where the interior and exterior lights controlled by the Wireless Area Controller are changed based on the occupancy set status. The occupancy set is composed of one or more occupancy

sensors, and it shall turn lighting off within 20 minutes of an occupant leaving a space.

- c. A manual command basis where a user or a program sends an override command using a wireless wall station, the mobile application, or BACnet/IP or Public API. The BACnet/IP and Public API signal will be received via the Insight Manager/supervisory system.
14. Allow users to backup the programming to prevent data loss and restore fixtures to operational modes.
15. Construction Grouping:
- a. PAIR button to allow automatic creation of Construction Group allowing simplified automatic control of all connected devices and sensors.
 - b. The patent-pending Construction Grouping mode permits contractors to complete a quick system start-up to confirm that the devices have been installed correctly instead of waiting for factory-trained technicians to get the lights on a project in working order. Contractors follow a simple process the pair the wireless devices with the appropriate WAC and initiate occupancy-based lighting control functionality. This saves lighting energy during the project's construction phase by ensuring that the lights are turned off when the area is unoccupied.
 - c. Construction grouping visually indicates to the installer that devices have received wireless communication from the Wireless Area Controller and received a unique individual address. Systems that do not provide a visual indication of device connection status shall not be acceptable.
 - d. Construction grouping provides an automatic grouping of connected devices to provide simple occupancy-based and wall station control of all devices without requiring a factory-trained technician. Systems that require special software or training to group wireless devices shall not be acceptable.
16. Scalability and Data Integrity:
- a. Deployed as a dedicated installation managing up to 150 wireless devices (connected devices, connected sensors). When deployed as a dedicated installation, the Wireless Area Controller acts as a local wireless access point for the Wi-Fi connection method to the Mobile Application.
 - b. Deployed as a network installation managing up to 150 wireless devices (connected devices, connected sensors) per Wireless Area Controller. When deployed as a network installation, the Wireless Area Controller connects to the building LAN or wireless network as a client using DHCP. The maximum number of Wireless Area Controllers on the building network depends on the building network configuration.
17. WaveLinx Pro model WACP2-POE

2.07 CONNECTED APPLICATIONS

- A. WaveLinx Pro Mobile Application (WAPP):

1. Administrative programming and editing may be conducted via an intuitive ios or Android mobile application.
2. Mobile Application shall support the following features:
 - a. Network discovery of multiple Wireless Area Controllers.
 - b. Naming and identification of Wireless Area Controllers.
 - c. Unique administrative login credentials for each Wireless Area Controller.
 - d. Discovery of wireless devices per Wireless Area Controller (Find Devices).
 - e. Creation of up to fifty (50) area per Wireless Area Controller.
 - f. Creation of up to sixteen (16) zones per area – up to 200 total zones per controller.
 - g. Creation of up to six (6) occupancy sets per area – up to 100 total occupancy sets per controller.
 - h. Creation of daylight sets for each integrated luminaire.
 - i. Creation of Demand Response values for each area.
 - j. Definition of scene values for each area.
 - k. Definition of schedules for each Wireless Area Controller.
 - l. Blink identification and reverse identification of each connected device and sensor.
 - m. Identified connected devices and sensors will indicate on the Mobile Application their selection by the device icon pulsing on the screen.
 - n. Ability to utilize drag and drop, multi-select and filter capabilities for the easy association of connected devices and sensors to a defined area.
 - o. Automatic Code Commissioning features include:
 - 1) Automatic association of all devices added to an area to provide a California Title 24 code-compliant sequence of operations.
 - 2) All occupancy sensors are joined together to provide an Automatic ON to 50% light level.
 - 3) All occupancy sensors are joined together to provide an Automatic OFF of all luminaires and plus load after 20 minutes with no occupancy detected.
 - 4) Automatic closed-loop daylighting to approximately 500 lux (46 footcandles).
 - 5) Automatic wall station button mapping provides the dominant button providing a 50% light level all other buttons provide multi-level dimming control 30% - 100%.

- 6) Automatic display of area power measurement data.
- 7) Automatic Demand Response of 20%.
- 8) Additional screens if needed to adjust Automatic Code Commissioning settings.

PART 3 – EXECUTION

3.01 SYSTEM ARRANGEMENT

- A. System arrangement shall be consistent with the component locations and riser diagram shown on the drawings.
- B. Precise as-built mark-ups (illustrating actual field wiring arrangements and equipment configurations) shall be submitted to the Engineer.

3.02 INSTALLATION

- A. Wiring:
 1. It is the intent of this specification that all associated wiring (per manufacturer's requirements) shall be the responsibility of this Contractor except that all final connections at the system components (in a neatly dressed fashion) shall be executed by an authorized technician who shall check for proper circuit resistance and shorts to ground prior to consummating the terminations.
 2. All concealed wiring shall be shielded (as required) plenum cable.
 3. All exposed wiring shall be installed in dedicated electrical metallic tubing with set-screw and compression type couplings and connectors for interior dry locations and interior wet locations or exterior locations, respectively.

3.03 PROGRAMMING

- A. General:
 1. Programming shall be executed by an authorized technician.
- B. Operation:
 1. Expandable and reprogrammable at any time up to system's maximum capacity.
 2. Operating system shall be field programmable for program changes and shall not require any factory modifications.
 3. Each component shall be uniquely identified by an address code (Owner selected) entered at time of installation.

3.04 SUPERVISION

- A. General:

1. Supervision and testing shall be executed by an authorized technician.

B. Supervision:

1. Provide on-site observation throughout the system construction period lending all guidance necessary to insure a proper installation.
2. Perform the prescribed "systems demonstration" and "instruction".
3. Provide as-built drawings.

3.05 FACTORY COMMISSIONING

- A. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician, who will verify a complete, fully functional system.
- B. The electrical contractor shall provide the Architect and Engineer with twenty-one working days written notice of the system start-up and adjustment date.

3.06 INSTRUCTION

- A. Provide thorough demonstrative instruction (2, 4-hour sessions) via factory trained technicians (representatives of the manufacturer's authorized distributor), secure the Owner's written acknowledgement and submit to the Architect/Engineer.

END OF SECTION

SECTION 26 69 70

IDENTIFICATION

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Furnish and install identification for all equipment, cover plates, conduit, wire and cable and underground utilities.
- B. Identification shall include labels, warning tape and ceiling markers.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Brady, Seton, Thomas and Betts, or approved equal.

2.02 DESCRIPTION

- A. Labels:
 - 1. Exterior equipment:
 - a. Standard, phenolic, engraved nameplates.
 - b. Appropriately sized lettering:
 - i. Large equipment:
 - 1. 3/4" high by 1/2".
 - ii. Small equipment:
 - 1. 3/8" high by 1/4".
 - 2. Interior equipment:
 - a. Industrial-strength, tear-proof, laminated tape, moisture resistant, extreme temperature, UV resistant.
 - b. 24 mm (1" high) x length as required.
 - c. Brother TZe.
 - 3. Cover plates:
 - a. Industrial-strength, tear-proof, laminated tape, moisture resistant, extreme temperature, UV resistant.
 - b. 6 mm (1/4" high) x length as required.

- c. Brother TZe.
- 4. Conduit:
 - a. Semi-rigid plastic with pre-set curl (designed to “snap on” with substantial overlap for smaller sizes and held firmly in place with tie-wraps for larger sizes), complete with panel designation and distribution characteristics.
- B. Warning tape (underground utilities):
 - 1. Metallic utilities:
 - a. 4.0 mils thick, 6” wide, appropriate American Public Works Association (APWA) color code and wording identification, heavy duty polyethylene.
 - 2. Non-metallic utilities:
 - a. 4.5 mils thick, 6” wide, metallic, appropriate American Public Works Association (APWA) color code and wording identification, heavy duty polyethylene.
- C. Ceiling Markers:
 - 1. 3/4” diameter, 1/16” thick self-adhesive label, blue.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Equipment labels (using the precise alphanumeric designation shown on the drawings) shall be securely mounted (in a conspicuous position) with appropriate fasteners and shall be applied to ALL equipment.
- B. Cover plate labels (using the exact panelboard name and associated branch circuit number as field installed) shall be securely mounted (in a conspicuous position horizontal to the floor slab) to ALL cover plates.
- C. Conduit labels shall be located to ensure continuous systems identity.
- D. Identify ALL wire and cable at ALL terminations.
- E. Mark the location of all data cable drops located above the ceiling provided for future use with ceiling markers attached to ceiling grid system to help in identification.

END OF SECTION

SECTION 31 12 01

SITE PREPARATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in Division 31, 32 and 33.

1.02 DESCRIPTION OF WORK

- A. The extent of site preparation is shown on the drawings.
- B. Site preparation work includes, but is not limited to, the following:
 - 1. Site investigation and underground utility identification
 - 2. Protection of existing trees, shrubs, and lawns to remain
 - 3. Topsoil stripping and stockpiling on site (See Section 32 92 01)
 - 4. Site clearing and removals
 - 5. Temporary construction fences and gates
 - 6. Saw cutting
 - 7. Relocations/salvaged materials
 - 8. Clean up
- C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 22 01 - Site Earthwork
- B. Section 32 92 01 - Lawns
- C. Section 33 40 01 - Storm Drainage

1.04 SITE INVESTIGATION

- A. The Contractor shall visit the site before bidding, inform and familiarize themselves of all site conditions, including but not limited to, site topsoil, sub-soil, rock, subsurface and groundwater conditions affecting proposed work. No allowance or additional cost will be made in the work of this contract for failing to determine overall project site conditions.
- B. Verify locations and protect utilities and structures, whether or not shown on the drawings. Existing utilities and structures shown on the drawings are for the Contractor's convenience and locations are not guaranteed.
- C. Verify survey information given on drawings. Walk the site with the Owner's Facilities Management Personnel to discuss approximate locations of reputed utilities not shown on the survey, prior to performing work. Notify the Architect of any and all discrepancies prior to commencing work. Commencement of work will be construed as complete acceptance of survey information.
- D. Locate and protect from disturbance existing survey monuments, pins, markers and benchmarks whether or not shown on drawings. When any disturbance or damage

occurs, notify Architect in writing within 24 hours. Describe nature of disturbance or damage and date first occurred. Provide copies to applicable government and municipal agencies. Pay costs for restoring monument to satisfaction of said agencies, at no additional expense to the Owner.

1.05 JOB CONDITIONS

- A. The terms "Architect" and "Landscape Architect" for Divisions 31, 32 and 33 work shall mean Appel Osborne Landscape Architecture, 102 West Division St., Suite 100, Syracuse, NY 13204, Tel. (315) 476-1022, Facsimile (315) 479-7573, or other representative(s) that MARCH Associates may determine.
- B. Examine drawings and specifications for the entire project. Become familiar with the scope and sequencing of work required. Coordinate and cooperate with other Contractors and trades working in and adjacent to the project.
- C. Examine work prepared prior to this contract. Commencement of work will be construed as complete acceptance of all preparatory work by others.
- D. Obtain and pay for permits required by authorities. Perform the work in compliance with applicable standards, codes and requirements of governing authorities having jurisdiction.
- E. Safety is the sole responsibility of the Contractor.
- F. Burning on site and use of explosives are not permitted.
- G. Responsibility for existing utilities:
 - 1. Contact Dig Safely New York at least two (2) full working days, and not more than ten (10) working days, before digging begins or as required by latest state law. Locate by hand excavation and provide protection from damage to existing utilities to remain in the area. (Tel. 811)
 - 2. Existing utilities encountered within excavated areas shall be supported, blocked and/or braced in a manner approved by the owner of the utility. Leave supports in place to the extent required by the owner of the utility.
 - 3. Should uncharted or incorrectly charted utilities be encountered, notify the Architect immediately for directions as to procedure.
 - 4. Do not break utility connections without providing temporary services as acceptable to the Architect and the owner of the utility.
 - 5. Repair and pay for damages to existing utilities as directed by utility Owner at no additional cost to the Owner.
 - 6. Cap ends of utilities to be abandoned or removed in accordance with regulatory agencies and as directed by the Architect.
- H. Provide protections and conduct operations to prevent injury and damage to persons, work of other Contractors, existing items to remain, structures, pavements, lawns, and adjacent properties.

- I. Restore work damaged by this Contractor inside and outside the contract limits to the condition existing prior to the start of work, unless otherwise directed, to the satisfaction of the Architect at no additional cost to the Owner.
- J. Vehicular and pedestrian traffic control:
 - 1. Maintain vehicular and pedestrian traffic during construction activities.
 - 2. Provide alternate routes and traffic control around closed and obstructed traffic ways as required by governing regulations or the Owner.
 - 3. Provide temporary fencing, flagpersons, barricades, warning signs, and warning lights or other measures to protect the public and cause the least interruption of work.
- K. Field Measurements: Take necessary field horizontal and vertical measurements required in order to perform the work and design intent shown on the drawings, and outlined in the specifications. Assume complete responsibility for accuracy of such measurements and dimensions.
- L. Removal of spoils, dust control, debris, and clean up:
 - 1. Control air pollution caused by dust and dirt; comply with governing regulations. Water to control dust when necessary and as directed by the Architect or Certified Erosion Control Specialist. Provide water sprinkling materials, equipment and labor to prevent the nuisance of dust to the surrounding areas.
 - 2. Legally dispose of removed and demolished items, including trash and debris, off the Owner's property, at a licensed disposal facility having adequate capacity to accept the project's waste.
 - 3. Burning of combustible materials on the site is not permitted.
 - 4. During the contract and at intervals as directed by the Architect, clear the site of extraneous materials, rubbish, construction waste, and debris. Leave the site in a clean, safe, neat, well-draining condition.
 - 5. Soil Removal: Sweep roads, access ways, paved areas, and parking areas where soil, mud and debris have dropped or tracked from construction and delivery vehicles on a daily basis and as directed by the Architect or Certified Erosion Control Specialist.
 - 6. Spoils: Remove from site and dispose when not required for fill or determined to be unsatisfactory soil material per Section 31 22 01 - Site Earthwork.
- M. Construction Review - General: Site visits will be made by the Architect to observe construction conformance to drawings and specifications. The occasional site visits by the Architect shall not be construed as supervision of construction or make them responsible for the safety programs and precautions, including but not limited to: the safe access, visit, use, work travel, or occupancy of any person. Site visits shall not make the Architect responsible for means, methods, techniques, sequences or procedures of construction selected by the Construction Manager, Contractor or his Sub-contractors.
- N. Site Complexity: The existing site will be intensively developed. Because of the construction and resulting graphic complexity, it is impractical to show every detail. However, the general design intent is clearly shown and shall be applied to individual

conditions not specifically shown as directed by the Architect and at no additional cost to the Owner.

- O. Asbestos, Toxic and Hazardous Materials: The Division 31, 32 and 33 site work contract does not include testing for, handling or removal of hazardous materials such as, but not limited to: asbestos, fuel, oil, PCB's, or other toxic or hazardous waste materials as identified by the EPA and/or NYSDEC. If any such materials are encountered during any part of the site work, the Contractor is responsible for identifying potential hazardous material and immediately notify all governing agencies having jurisdiction as required by law. Also, within one (1) hour of discovery notify the Architect, Landscape Architect, Consultants, and Owner. The Owner shall provide testing and removal by others, under separate contract. The Contractor shall recommence work under this contract when the Owner provides written certification that remediation is complete per governing agency. The Contractor shall not be penalized for any delays caused by the hazardous testing and removal, unless such hazardous material incident was a result of Contractor's operations. The Contractor shall indemnify and hold harmless the Architect, Landscape Architect, Consultants and Owner, agents, and employees from and against all claims, damages, losses and expenses, direct and indirect or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from the performance of the work by the Architect, Landscape Architect, Consultants and Owner, or claims against the Architect, Landscape Architect, Consultants and Owner arising from the work of others, related to hazardous waste.

The above indemnification provision extends to claims against the Architect, Landscape Architect, Consultants and Owner which arise out of, are related to, or are based upon, the dispersal, discharge, escape, release or saturation of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, or pollutant in or into the atmosphere, or on, onto, upon, in or into the surface or subsurface soil, water or water courses, objects, or any tangible or intangible matter, whether sudden or not.

Should the hazardous material incident be the result of the Contractor's operations, the Contractor shall be responsible for all costs associated with the discovery and remediation of such hazardous material such as, but not limited to: testing, consultant fees, damage, loss, fees and charges of attorneys, court and arbitration costs, claims by other contractors, direct and indirect or consequential damages.

- P. Salvageable Items: Remove at any time after work starts. Storage or sale on site of salvageable and removed items is not permitted. Do not remove topsoil from site without written permission from the Owner.
- Q. SUBMITTALS/PROCEDURES: Submit Tests, Shop Drawings, Material Certificates (showing content/mechanical analysis) and Manufacturer's Product Data (MPD) to Architect for review a minimum of two (2) weeks prior to installation.
1. Provide a minimum of five (5) copies from material producer or laboratory, stamped as checked and approved by the Contractor before submittal to the Architect or as otherwise indicated in Division 1. (Note: Electronic submittal process may be acceptable when approved by the Owner and Architect.)
 2. Refer to individual specification sections for a list of required submittals.
 3. For each material certificate required, provide certification by an Architect approved independent testing laboratory which gives analysis results and states that the material complies with or is superior to the specified requirements.

1.06 SUBMITTALS: (See 1.05, above)

- A. Provide photographic documentation. Photographically document existing features which, may be affected by the construction, inside and outside the contract limit line. Existing features include, but are not limited to: structures, pavements, curbs, utilities, lawns and vegetation, especially individual trees which are over six (6") inches in diameter and noted to remain on the drawings. Also, particular attention shall be paid to the construction access, stockpile and haul road areas. Distribute a copy of the photographic documentation (color prints or digital format) to the Owner and Architect prior to the start of construction.
- B. Temporary Chain Link Fence And Gates Manufacturer's Product Data (MPD).

PART 2 - PRODUCTS

2.01 TEMPORARY CHAIN LINK FENCE AND GATES

- A. Shall be new or good quality 6'-0" height galvanized chain link fence and gates.
- B. Materials and layout shall be as detailed on the drawings and as directed by the Owner.

2.02 PLASTIC FENCE

- A. Shall be new or good quality used 4'-0" high heavy duty orange plastic fence NC450.
- B. Posts shall be new or good quality U-channel posts to hold plastic fence.

2.03 OTHER PROTECTIVE DEVICES

- A. Shall include, but not be limited to; wood planks, rubber mats, barriers, lights, barricades, coverings, traffic controls, steel plates, and other temporary protections.
- B. Contractor to provide all necessary protections required by Occupational Safety and Health Administration (OSHA).

PART 3 - EXECUTION

3.01 PROTECT EXISTING VEGETATION TO REMAIN

- A. Prior to commencing site preparation work, notify Architect, and meet on site to locate existing trees, lawns and vegetation which are to remain.
- B. Protect and keep existing vegetation to remain free from physical damage. Keep in a healthy, vigorous growing condition for the entire construction period as follows:
 - 1. Keep site disturbance and staging limits to a minimum. Obtain approval from Owner for material and equipment storage areas. Limit access points and routes to the project site. Coordinate site access with other trades and contractors on the work site.
 - 2. Groups of Trees and Vegetation: Place orange plastic construction fencing around drip line(s) of trees and plant beds as detailed or directed by the Architect. Do not store materials, run equipment, park vehicles, or otherwise disturb area within the drip line (full canopy of tree) or in plant beds.

- 3. Specimen and Individual Trees: Protect each as noted and detailed. Do not store materials, run equipment, park vehicles or otherwise disturb area within the drip line (full canopy of tree).
- C. Rejuvenate damaged vegetation by pruning watering, fertilizing, staking and other methods as directed by the Architect. Replace trees and other vegetation that cannot be restored to full growth with comparable size, quantity, quality and species as determined by the Architect.
- D. Repair lawns disturbed due to construction operations outside the grading limits, as specified and directed by the Architect. Provide screened topsoil, seed, and mulch over damaged lawn areas, access ways or where tire rutting occurred.

3.02 TOPSOIL STRIPPING AND STOCKPILING ON SITE

- A. Strip full depth of existing topsoil from areas to be regraded, paved, or otherwise built upon. When amount of available topsoil exceeds what is indicated in geo-tech/boring report, on site test pits, or Contractor assumed depth, continue to remove all topsoil and lower the paved or built element subgrade. Place additional satisfactory earth fill in uniform depths as indicated in the Site Earthwork Section 31 22 01. Maintain finished grades as shown on the drawings. This work shall be done at no additional cost to the Owner.
- B. Minimum quantity of topsoil shall be as needed to provide four (4") or six (6") inches settled depth on lawn areas. Verify quality and quantity. Supply imported topsoil when amount of available topsoil meeting above requirements is less than what is required for the proposed lawn areas. See Section 32 92 01 for imported topsoil requirements.
- C. When amount of available topsoil meeting above requirements exceeds what is required for the proposed lawn and athletic field areas, lower the lawn and athletic field subgrade and place additional topsoil in a uniform depth as directed by the Architect. Maintain finish grades as shown on the drawings. This work shall be performed and supplied at no additional cost to the Owner.
- D. Topsoil shall be well drained, homogeneous texture soil of uniform grade, without the admixture of subsoil material. Topsoil shall be free of dense material, hardpan, and stone over three-quarters (3/4") inch in diameter, and other objectionable foreign material including, but not limited to, brick, concrete, asphalt, glass, nails, screws, toxins, hazardous wastes and chemicals (such as, but not limited to, atrazine and muriatic acid) that may be injurious to humans, animals and plant materials.
- E. Stockpile on site where shown on the drawings or as directed by the Owner. Provide all hauling as necessary. Do not mix topsoil stockpiles with other materials. Do not remove topsoil from site without written permission by the Owner. Stabilize and maintain all stockpiles as specified.

3.03 SITE CLEARING AND REMOVALS

- A. Items and materials noted to be removed shall become the property of the Contractor, unless otherwise noted. Obtain Owner's approval prior to removal off site or for relocation of salvaged material on site. Remove material off site and legally dispose of it. Backfill voids with imported granular backfill, placed in eight (8") inch layers compacted to 95% maximum density.
- B. Remove physical elements above and below grade as shown and which interfere with proposed construction. Physical elements include but are not limited to: trees, root

systems, shrubs, vines, grass, vegetation, pavements, walks, curbs, gutters, foundations, previous construction materials, glass, headwalls, flared end sections, catch basins, manholes, inlets, drywells, septic tanks, unused utilities, pipes, cisterns, walls, rocks, and other debris.

- C. Trees, shrubs and roots shall be completely removed and chipped into two (2") inch and smaller pieces and spread in existing wooded areas no deeper than four (4") inches settled depth. Spread where shown on drawings or as directed by the Architect.
- D. Maintain existing utilities shown to remain and protect from damage during demolition and construction operations. Do not interrupt existing utilities; provide temporary services when required, as acceptable to the Architect.
- E. Research with Owner possible locations of existing subsurface utilities prior to excavating.

3.04 SAW CUTTING

- A. The Work consists of vertical saw cutting of the existing asphalt or concrete pavement structure to facilitate the removal of the asphalt or concrete bound material.
- B. The equipment shall be capable of producing a smooth vertical saw cut without causing damage to the adjacent pavements or related site features.
- C. The Contractor shall saw cut the asphalt/concrete pavement to a depth which will allow removal of the material without causing damage to the adjacent pavement. Rough, jagged or cracked edges will not be acceptable. Concrete pavement shall be removed at the nearest contraction joint.

3.05 RELOCATIONS

- A. Any item noted to be relocated shall be removed by the Contractor from its existing position without damaging it, stored, protected from theft, fire, vandalism and damage for the project duration. Reset in the location(s) and in the manner detailed, noted on the drawings or specified.
- B. Backfill voids with imported granular fill material, placed in eight (8") inch layers compacted to 95% maximum density when located in proposed pavement areas or 90% maximum density when located in proposed non-paved areas.
- C. Salvaged items shall be returned to the Owner as noted on the drawings. Move items to Owner designated areas.

3.06 CLEAN UP

During the contract and at intervals as directed by the Architect and as site preparation is completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION

SECTION 31 20 00

BUILDING EARTH MOVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Excavation and Building Pad Preparation for new Building
 - 2. Preparing subgrades for slabs supported on-grade.
 - 3. Excavating and backfilling for buildings, equipment support pads, entry pads / frost walls and miscellaneous structures.
 - 4. Drainage course for slabs supported on-grade.
 - 5. Excavating and backfilling trenches within building lines.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 45 33 "Code-Required Special Inspections and Procedures" for independent testing agency procedures and administrative requirements.
 - 2. Division 01 Section "Allowances" for quantity allowance provisions related to unit-price rock excavation and authorized additional excavation.
 - 3. Division 01 Section "Unit Prices" for unit-price rock excavation and authorized additional excavation provisions.
 - 4. Divisions 22, 23 and 26 for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.

1.03 REFERENCED GEOTECHNICAL INFORMATION AND REPORTS

- A. The Building Site Preparation, Foundation Design Parameters and General Notes presented on the drawings and within this specification section (31 20 00 "Building Earth Moving") are based on the information contained within the following document as prepared by CME Associates, Inc and generally accepted good engineering practices:
 - 1. "Subsurface Exploration and Foundation Recommendations Report, Cornell Cooperative Extension Oneida County Building Addition, Oriskany, New York" prepared by CME Associates, CME Report No. 28106B-01-0224, dated February 07, 2024.

1.04 UNIT PRICES

- A. Unit prices for earthwork and rock excavation are included in Division 01 Section "Unit Prices."
- B. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.
 - 1. 24 inches outside of concrete forms other than at footings.
 - 2. 12 inches outside of concrete forms at footings.
 - 3. 6 inches outside of minimum required dimensions of concrete cast against grade.

4. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
5. 8 inches beneath bottom of concrete slabs-on-grade.
6. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

1.05 DEFINITIONS

- A. Backfill: Soil materials or controlled low-strength material used to fill an excavation.
 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- C. Imported Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Drainage Fill Course: Layer below the vapor retarder / barrier supporting slab supported on-grade used to minimize capillary flow of pore water.
- E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 1. Authorized Additional Excavation: Excavation below subgrade elevations as directed by the Architect or the Owner's designated On-site Representative. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices or changes in the Work.
 2. Bulk Excavation: Excavations more than 10 feet in width and more than 30 feet in length.
 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by the Architect or the Owner's designated On-site Representative. Unauthorized excavation, as well as remedial work not directed by the Architect or the Owner's designated On-site Representative, shall be without additional compensation.
- F. Common Fill: Satisfactory soil material from excavated on-site soils, including suitable existing fill, or imported from off-site. Common fill soil material is to be used in landscape areas outside of structural areas.
- G. Imported Select Granular Structural Fill: Imported Select Granular Structural Fill shall be of high quality natural or manufactured mineral aggregate product, which has been approved for use after review of all required prequalification test submittals consisting of well-graded sand and gravel material, approved recycled product or crushed rock product which is capable of being compacted to the required density at the proper moisture content and which is 99% free of deleterious materials, trash, roots, frozen material and organic or other foreign matter and meets the quality and gradation requirements of Table 1 provided in Article 2.01, "Soil Materials" for Imported Select Granular Structural Fill Material.

Imported Select Granular Structural Fill material to be used under slabs and to backfill foundation walls inside the building shall be free of Recycled Asphalt Pavement (RAP) products.

Imported Select Granular Structural Fill material shall be accepted on the basis of gradation, soundness, plasticity index and a well-defined Moisture-Density Relationship Curve. The prequalification submittal for Select Granular Fill shall include test results which are not more than 60 days old.

Imported Select Granular Fill to be placed within 2'-0" of final exterior grade shall be subject to Soundness requirements. Soundness shall be less than 30 percent loss based on a four-cycle magnesium sulfate soundness test. Plasticity Index of that portion of fill material passing the No. 40 mesh sieve shall not exceed 5.0. The Contractor shall submit material test data for review and approval by the A/E and Inspecting Professional Geotechnical Engineer (IPGE), prior to ordering material.

The moisture content of this material shall be adjusted prior to application of compaction such that it is within 2% of Optimum Moisture Content as established by the Inspecting Professional Geotechnical Engineer (IPGE) and testing laboratory.

Imported Select Granular Structural Fill material shall be used for:

1. General grade increases within the Building Pad / Equipment Support Pads / Entrance Pads / Frost walls or within the Influence Area of the Foundations.
2. Filling and backfilling of undercut areas requiring remediation (including excavation of yielding and unsuitable existing soil or organic materials) within the Building Pad or within the Influence Area of the Foundations.
3. Filling and backfilling of areas where existing building subsurface foundations and / or structures have been removed as part of the demolition process and that are within the Building Pad or within the Influence Area of the Foundations of the proposed additions.
4. Backfilling against the interior and exterior surfaces of foundation walls, including under building floor slabs-on-grade within the Building Pad / Equipment Support Pads / Entrance Pads / Frost walls or within the Influence Area of the Foundations.

- H. Crushed Stone Pad under Footings (**As shown on Construction drawings** or if found to be required by Existing Subsurface Conditions): Imported borrow soil material meeting the quality and gradation requirements of a "Crusher Run Limestone" or 50/50 Blend of NYS DOT Size Designation Number 1 and Number 2 Stone (with 100 percent Fractured Faces), placed over tested and approved compacted firm and stable undisturbed natural material or newly placed compacted and approved imported select granular structural fill foundation subgrades and shall extend a minimum of 6-inches wider than the footing. A soil separator fabric (such as Mirafi 140 N or approved equal) shall be used to separate the Crushed Stone from the surrounding soils. The moisture content of this material shall be adjusted prior to application of compaction such that it is within 2% of Optimum Moisture Content as established by the Inspecting Professional Geotechnical Engineer (IPGE) and testing laboratory.

1. If on-site Silty and / or Clayey soils and / or flowing sandy and / or other unstable soils are encountered during excavation, these soils tend to be poorly drained and water sensitive. Footing bearing grades which appear firm immediately after exposure, can become saturated, soft, and muddy in the presence of water and construction traffic (even underfoot traffic). The Contractor is alerted to the potential for these conditions, and shall protect and maintain bearing grade until completion of footing construction and backfill placement. If encountered, the Contractor has the option to provide a crushed stone pad and soil separation fabric as necessary to protect the integrity of the exposed soil footing subgrade bearing grades during footing excavations. Refer to the Contract Drawings for additional information.

- I. Rock: Unclassified earth material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting (Note: Blasting is NOT permitted):

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crowd force of not less than 18,700 lbf; measured according to SAE J-1179.

2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 45,000-lbf breakout force; measured according to SAE J-732.
- J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, crushed stone pads or topsoil materials.
- L. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- M. Building / Equipment Support Pads / Entrance Pads / Frost Walls: The Building / Equipment Pad Building Pads / Entrance Pads / Frost walls is defined as the following:
1. Building / Equipment Support Pads / Entrance Pads / Frost Walls: The Building / Equipment Pad Building Pads / Entrance Pads / Frost walls: The area within the footprint of the building addition, the equipment support pads, the entrance pads or the frost walls, plus adjacent slabs and sidewalks, plus a five (5) foot nominal buffer all around.
 2. Within the Existing Building Footprint: The area within the existing building in which structural modifications and work is to be performed, plus a five (5) foot nominal buffer all around.
- N. Influence Area of Foundations: The influenced area of the foundations is defined as the area under a plane starting at the bottom of the footing and extending downward and outward at an angle of 45 degrees measured from the horizontal and is measured from:
1. One (1) foot outside the outermost edge at base of foundations, slabs, and rigid pavements.
 2. 0.5 feet outside the exterior spring line of pipes and culverts.

1.06 SUBMITTALS

- A. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate some portion of the work showing fabrication, layout, setting or erection details.
- Refer to Division 1, Section 01 30 00 - "Administrative Requirements" and information within this section for additional submittal requirements.
1. Identify details by reference to sheet and detail numbers shown on shop drawings.
 2. Sheet size, multiple of 8 ½ by 11 inches, not to exceed size of contract drawings when unfolded.
 3. **Photographic reproductions of contract drawings will NOT be accepted as shop drawings and will be REJECTED without review**
- B. Portable Document Format (PDF) Files: All submittals required for this section (including, but not limited to, Product Data and Material Test Reports) shall be submitted to the A/E in "PDF" electronic format.
- C. Product Data: For the following:
1. Each type of plastic warning tape.

2. Controlled low-strength material, including design mixture.
 3. 12-by-12-inch sample of geotextile fabric.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 2. Laboratory compaction curve according to ASTM D1557 for each on-site or borrow soil material proposed for fill and backfill.
- E. Pre-excavation Photographs or Video Tape: Pre-excavation Photographs or Video Tape taken by the Contractor shall show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by earthwork operations. Submit before earthwork operations begin.
- F. Instrument Survey of Exposed Rock Surface Contours: If rock is encountered within the influence area of the building footprint following stripping and removal of all existing asphalt, concrete, top soil and surficial organic or other deleterious / unsuitable existing materials before reaching the intended design bearing depths, the Contractor shall notify the Owner's designated On-site Representative and A/E for additional direction before proceeding. The Contractor shall perform an instrument survey of the exposed rock surfaces to provide a localized topography plan that identifies the elevations of the top of existing rock. This will provide the basis for determination of the actual quantities for construction of the building foundation systems if rock removal is required. This survey shall be provided to the Owner's designated On-site Representative and A/E for review prior to the start of construction.

1.07 QUALITY ASSURANCE

- A. Code-Required Special Inspections and Procedures: Work associated with this section is subject to meeting the requirements and qualifications of Division 1 Section 01 45 33 "Code-Required Special Inspections and Procedures".
- B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.08 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the Architect or the Owner's designated On-site Representative and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify the Architect or the Owner's designated On-site Representative not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without the Architect's or the Owner's designated On-site Representative's written permission.
 3. Contact utility-locator service for area where Project is located before excavating.

- B. Referenced Geotechnical Data Information and Reports: The Building Site Preparation, Foundation Design Parameters and General Notes presented on the drawings and within this specification section (31 20 00 "Building Earth Moving") are based on the combination and interpretation of information contained within the "Referenced Geotechnical Data Information and Reports" listed in Article 1.03 above and generally good engineering practices for use with the development of the Project Site and Building Design.
- C. Subsurface Conditions: Based on information contained in the Referenced Geotechnical Report, the subsurface investigations encountered the following.

As noted in the Referenced Geotechnical Report, the subsurface conditions presented herein have been generalized for simplicity and brevity from the actual data obtained from the Subsurface Exploration conducted at the subject project site. It is possible for the subsurface conditions between sampling intervals and between exploration locations to vary from that inferred and/or given below or in the Exploration Logs. Please refer to the Referenced Geotechnical Report - Test Boring Logs SB-1 to SB-4 included in the Referenced Geotechnical Report for actual conditions encountered at the time, location, and elevation of each sampling.

The Test Borings (SB-1 to SB-4) sampled surfacings (Asphalt Pavement or Topsoil and Organic Matter) at grade. Below surfacings, the Test Borings penetrated a subsurface profile consisting of Existing Fill, underlain by Silt, underlain by Weathered Shale Bedrock. A brief description of each stratum is provided below in the approximate order of encounter.

- **Surfacings:** Borings SB-1 and SB-4 penetrated about 6 inches of Topsoil and Organic Matter at grade. Borings SB-2 and SB-3 penetrated about 3 to 5 inches of Asphalt Pavement at grade.
- **Existing Fill:** Below surfacings, Borings SB-2 to SB-4 penetrated Existing Fill or reworked material to about 2 to 8 feet below existing grade. The Existing Fill in these Test Borings consists of a random mixture of soil (silt, sand, gravel and clay), and appears to have been placed in an uncontrolled manner (i.e., not placed in controlled, compacted lifts).
- **Silt:** Below surfacings or below Existing Fill, Borings SB-1, SB-2 and SB-4 identified a Silt stratum with an intermixed Sandy Gravel stratum to about 10 to 22 feet below grade. The Silt stratum consists predominately of Silt mixed with a lesser and variable Gravel, Sand and Clay content, which presents as a dense Till-like consistency near the bottom of this stratum. The Sandy Gravel stratum, where present, consists of Sand and Gravel, with a variable Silt and Clay content. Based on the SPT² Blow Counts, the Silty intervals have a consistency of medium stiff to hard, while the Gravelly intervals are medium compact in compactness.

Please see Table A below for estimated Existing Fill depths identified in the CME Soil Borings.

Table A: Approximate Bottom Depth/Elevation of Existing Fill			
Test Boring ID	Elev at Grade ¹ (Feet)	Fill Depth Below Grade ² (Feet)	Bottom Elev. (Feet)
SB-2	708.7	4	EL704
SB-3	709.1	8	EL 701
SB-4	706.6	2	EL 704
Notes: 1. Elevation at grade determined via hand-held GPS survey equipment. Please see <i>GPS Coordinates and Elevation Table in referenced Geotech Report</i> . 2. Depth of Fill at exploration locations are provided for planning and budgeting purposes only. Actual depths may vary and shall be determined during construction by the Inspecting Professional Geotechnical Engineer (IPGE).			

- **Weathered Shale Bedrock:** Below the Silt (in Borings SB-1, SB-2 and SB-4) and below Existing Fill (in Boring SB-3), all Borings penetrated a Weathered Shale Bedrock Stratum, to boring termination depths (15.2 to 24.2 feet below grade), where drilling became harder, or auger and sampler refusal was noted in probable bedrock. No rock coring was collected to further investigate the bedrock.

Note: As indicated on the Referenced Geotechnical Report, CME selected two samples of shale bedrock fragments collected from the Test Borings (advanced in December 2023) and sent them to CME's Subcontractor CMT Laboratories, Inc. (CMT) for expansive characteristic testing. CMT conducted Potentially Expansive Rock Testing on these samples. Please refer to the Referenced Geotechnical Report for the *CMT Summary of Test Results – Potentially Expansive Rock Testing* for test results. Per the Referenced Geotechnical Report, the report indicate the test results were reviewed and concluded that the shale samples tested have a low risk for expansion when exposed to air and water.

- D. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.
- E. Building Pad Preparation: Refer to the Contract Drawings and information defined within this specification section for specific criteria associated with excavations required to removed buried organic and / or unsuitable materials, specific criteria for preparation of existing subgrades and requirements for fill materials to raise the grades for the proposed new work.
- F. Existing Rock Elevations: Refer to Article 1.06.F for additional criteria associated with the existing rock elevations if applicable.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. General: Provide imported borrow soil materials as required.

Please Note: As indicated on the Referenced Geotechnical Report, the Contractor shall assume there will be areas within the building pad and influence area of the building construction where the on-site soil will contain existing uncontrolled fill, including, but not limited to, existing fill, organic material, soft wet/saturated unstable soils, man-placed fill, and other deleterious materials, all of which is deemed unsuitable soil material and cannot be utilized to support the new building foundations or slabs on grade.

All unsuitable material shall be removed in its entirety as required within the proposed building pad until suitable and stable bearing soil (virgin inorganic Silt) is reached. Prior to replacement of the removed materials, the exposed existing subgrade shall be compacted, proof-rolled and tested as required by this specification section. The removed materials shall be replaced with Imported Select Granular Structural Fill as required and shall be placed in compacted and tested lifts in accordance with this specification section.

All removals and replacement of the removed material shall be performed in the presence of and monitored by the Inspecting Professional Geotechnical Engineer (IPGE) who shall verify that a suitable bearing material has been reached, that the proof-rolling / compactions has been properly performed and that the fill material has been placed in accordance with this specification section.

As such, the Contractor shall assume that the on-site excavated soils shall not be re-used as fill or backfill within the building pad and influence area of the building construction. Instead, Imported Select Granular Structural Fill shall be used within building pad and influence area of the building construction for all building pad fill, foundation backfilling and in all structural areas. Refer to information within this Section and information shown on the Contract

drawings for additional information.

The excavated existing on-site material shall be stockpiled as directed by the Owner's on-site Representative for consideration and testing for re-use as Common fill material. Approval for re-use shall be by the Inspecting Professional Geotechnical Engineer (IPGE) who shall be responsible for verify conformance with the referenced specifications and who shall determine if the material is suitable for re-use anywhere on-site. All unsuitable material that cannot be re-used shall be removed from the site and shall be legally disposed of. Refer to the Contract Drawings for additional information.

Refer to the Contract drawings for additional information.

- B. Common Fill: Satisfactory Soil Material from excavated on-site soils, including suitable existing fill, or imported from off-site. Common fill soil material is to be used in landscape areas outside of structural areas.
- C. Satisfactory Soil Material: These soils are defined as inorganic soil material, with a maximum particle size less than 3-inches in any dimension, and shall be free of debris, waste, frozen materials, vegetation, and other deleterious matter. These soils shall conform to the Unified Soil Classification System (USCS) Classes GW, GM, GC, GP, SW, SM, ML, ML-CL, SP and SC or a combination of these group symbols and shall exhibit a well-defined Moisture Density Relationship Curve.
- D. Unsatisfactory Soil Material: These soils include Unified Soil Classification System (USCS) Classes CH, MH, OH, OL, PT, CL (or a combination of these group symbols) and Miscellaneous Fill, Organic Matter, Cobbles and Boulders.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of Optimum Moisture Content at the time of compaction, and any soils rejected by the Engineer or the Owner's designated On-site Representative.
- E. Imported Select Granular Structural Fill: Imported Select Granular Structural Fill shall be of high quality natural or manufactured mineral aggregate product, which has been approved for use after review of all required prequalification test submittals consisting of well-graded sand and gravel material, approved recycled product or crushed rock product which is capable of being compacted to the required density at the proper moisture content and which is 99% free of deleterious materials, trash, roots, frozen material and organic or other foreign matter and meets the quality and gradation requirements of Table 1 provided in Article 2.01, "Soil Materials" for Imported Select Granular Structural Fill Material.

Imported Select Granular Structural Fill material to be used under slabs and to backfill foundation walls inside the building shall be free of Recycled Asphalt Pavement (RAP) products.

Imported Select Granular Structural Fill material shall be accepted on the basis of gradation, soundness, plasticity index and a well-defined Moisture-Density Relationship Curve. The prequalification submittal for Select Granular Fill shall include test results which are not more than 60 days old.

Imported Select Granular Fill to be placed within 2'-0" of final exterior grade shall be subject to Soundness requirements. Soundness shall be less than 30 percent loss based on a four-cycle magnesium sulfate soundness test. Plasticity Index of that portion of fill material passing the No. 40 mesh sieve shall not exceed 5.0. The Contractor shall submit material test data for review and approval by the A/E and Inspecting Professional Geotechnical Engineer (IPGE), prior to ordering material.

The Contractor shall submit material test data for review and approval by the A/E and Inspecting Professional Geotechnical Engineer (IPGE), prior to ordering material. Gradation shall meet the requirements of Table 1 below.

TABLE 1 – IMPORTED SELECT GRANULAR STRUCTURAL FILL NYSDOT Subbase Course, 2" Minus	
Sieve Size Designation	Percent Passing by Dry Weight
2 inch	100
¼ inch	25-60
No. 40	5-40
No. 200	0-10

The minimum requirements for a prequalification submittal shall include the following test results which are not more than 60 days old:

- Sieve Analysis – ASTM D422
- Moisture Density Relationship Modified Effort – ASTM D1557
- Plasticity Index – ASTM D4318
- Soundness Test – ASTM C88

The moisture content of this material shall be adjusted prior to application of compaction such that it is within 2% of Optimum Moisture Content as established by the Inspecting Professional Geotechnical Engineer (IPGE) and testing laboratory.

The Contractor shall assume that the on-site excavated soils shall not be re-used as fill or backfill within the building pad and influence area of the building construction. Instead, Imported Select Granular Structural Fill shall be used within building pad and influence area of the building construction for all building pad fill, foundation backfilling and in all structural areas. Refer to information within this Section and information shown on the Contract drawings for additional information.

However, the excavated existing on-site material shall be stockpiled as directed by the Owner's on-site Representative for consideration and testing for re-use as Common fill material. Approval for re-use shall be by the Inspecting Professional Geotechnical Engineer (IPGE) who shall be responsible for verify conformance with the referenced specifications and who shall determine if the material is suitable for re-use anywhere on-site. All unsuitable material that cannot be re-used shall be removed from the site and shall be legally disposed of. Refer to the Contract Drawings for additional information.

Refer to the Contract Drawings for additional information and notes specific to the proposed work.

1. See Article 1.05, "Definitions" and Article 2.01.A, "Soil Materials, General" for additional information.
- F. Crushed Stone Pad under Footings (**As shown on Construction drawings** or if found to be required by Existing Subsurface Conditions): Imported borrow soil material meeting the quality and gradation requirements of a "Crusher Run Limestone" or 50/50 Blend of NYS DOT Size Designation Number 1 and Number 2 Stone (with 100 percent Fractured Faces), placed over tested and approved compacted firm and stable undisturbed natural material or newly placed compacted and approved imported select granular structural fill foundation subgrades and shall extend a minimum of 6-inches wider than the footing. A soil separator fabric (such as Mirafi 140 N or approved equal) shall be used to separate the Crushed Stone from the surrounding soils. The moisture content of this material shall be adjusted prior to application of compaction such that it is within 2% of Optimum Moisture Content as established by the Inspecting Professional Geotechnical Engineer (IPGE) and testing laboratory.
1. See Article 1.05, "Definitions", for additional information.

- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Slab Subgrade – Drainage Fill (under slabs-on-grade): Imported borrow material consisting of a screened, gravel or crushed stone conforming to all of the requirements of New York State Department of Transportation (NYSDOT) Standard Specification for Item No. 304-2.02, Subbase Course Material, Type 2 Run-of-Crush Limestone or Type 4 or approved equal, placed over compacted foundation subgrades. The moisture content of this material shall be adjusted prior to application of compaction such that it is within 2% of Optimum Moisture Content as established by the Special Inspector's Professional Geotechnical Engineer (IPGE) and testing laboratory.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.
- K. Sand: ASTM C 33; fine aggregate, natural or manufactured sand.

2.02 GEOTEXTILE FABRICS

- A. Geotextile Fabric: Needle Punched, nonwoven, polypropylene geotextile fabric (Mirafi 140 N, or as approved equal) meeting the following material properties and performance criteria:
 - 1. Grab Tensile Strength @ Ultimate: 120 lbf; ASTM D 4632.
 - 2. Grab Tensile Strength Elongation @ Ultimate: 50 percent; ASTM D 4632.
 - 3. Trapezoidal Tear Strength: 50 lbf; ASTM D 4533.
 - 4. CBR Puncture Strength: 310 lbf; ASTM D 6241.
 - 5. UV Resistance: 70 percent after 500 hours' exposure; ASTM D 4355
 - 6. Apparent Opening Size: No. 70 US Sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 1.7 per second, minimum; ASTM D 4491.
 - 8. Flow Rate: 135 Gallons per minute per ft² ; ASTM D 4491.
 - 9. Weight: 4.8 oz per yd³ ; ASTM D 5261.
 - 10. Thickness: 40 mils, ASTM D 5199.

2.03 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:
 - 1. Portland Cement: ASTM C 150, Type I, II, or III.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch or 3/8-inch nominal maximum aggregate size.
 - 4. Water: ASTM C 94/C 94M.
 - 5. Air-Entraining Admixture: ASTM C 260.
- B. Produce conventional-weight, controlled low-strength material with 140-psi compressive strength when tested according to ASTM C 495.

2.04 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

- B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The Contractor is alerted to the following "Special Notations":
1. The information shown within Part 3 – EXECUTION of this Specification is intended to be "General" Information related to "BUILDING EARTH MOVING" applicable to the Project in the absence of more specific information provided on the Contract Drawings.
 2. As indicated on the Referenced Geotechnical Report, the Contractor shall assume there will be areas within the building pad and influence area of the building construction where the on-site soil will contain existing uncontrolled fill, including, but not limited to, existing fill, organic material, soft wet/saturated unstable soils, man-placed fill, and other deleterious materials, all of which is deemed unsuitable soil material and cannot be utilized to support the new building foundations or slabs on grade.
 3. All unsuitable material shall be removed in its entirety as required within the proposed building pad until suitable and stable bearing soil (virgin inorganic Silt) is reached. Prior to replacement of the removed materials, the exposed existing subgrade shall be compacted, proof-rolled and tested as required by this specification section. The removed materials shall be replaced with Imported Select Granular Structural Fill as required and shall be placed in compacted and tested lifts in accordance with this specification section.
 4. All removals and replacement of the removed material shall be performed in the presence of and monitored by the Inspecting Professional Geotechnical Engineer (IPGE) who shall verify that a suitable bearing material has been reached, that the proof-rolling / compactions has been properly performed and that the fill material has been placed in accordance with this specification section.
 5. As such, the Contractor shall assume that the on-site excavated soils shall not be re-used as fill or backfill within the building pad and influence area of the building construction. Instead, Imported Select Granular Structural Fill shall be used within building pad and influence area of the building construction for all building pad fill, foundation backfilling and in all structural areas. Refer to information within this Section and information shown on the Contract drawings for additional information.
 6. The excavated existing on-site material shall be stockpiled as directed by the Owner's on-site Representative for consideration and testing for re-use as Common fill material. Approval for re-use shall be by the Inspecting Professional Geotechnical Engineer (IPGE) who shall be responsible for verify conformance with the referenced specifications and who shall determine if the material is suitable for re-use anywhere on-site. All unsuitable material that cannot be re-used shall be removed from the site and shall be legally disposed of.

7. The Building Site Preparation, Foundation Design Parameters and General Notes presented on the drawings and within this specification section (31 20 00 "Building Earth Moving") are based on localized information obtained from the Referenced Geotechnical Report and generally good engineering practices for use with the development of the Project Site and Building Design.
 8. The analysis and recommendations contained in the Referenced Geotechnical Report are based on the specific data obtained from the limited subsurface explorations referenced in the report. The explorations indicate subsurface conditions only at the specific locations and times, and only to the depths penetrated. The validity of the recommendations are based in part on assumptions about the stratigraphy, as well as information about the proposed development provided by others. All assumptions shall be confirmed only during earthwork construction operations.
 9. However, the existing conditions and subsurface soil conditions may differ than those anticipated or noted on the Contract drawings and may require adjustments during Construction activities to resolve unforeseen conditions. All recommendations made in Referenced Geotechnical Report are based on the "Observational Method". The Observational Method ensures continuity from the design to the construction and has been at the heart of many successful construction projects. These assumptions rely on extensive use of Field Monitoring, Testing and Observational procedures employed during Construction. It is required that the Owner contract with an approved Inspecting Professional Geotechnical Engineer (IPGE) during Construction to verify all design recommendations and assumptions used to design and prepare the Contract Documents and to provide guidance on the best possible resolve. Use of these services typically allows the Owner to take advantage of conditions that may be more favorable than those anticipated based on the subsurface exploration program. Conversely, conditions less favorable than those anticipated are identified in a more timely fashion allowing for appropriate corrective action before proceeding with Construction.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- C. Site preparation for the areas within the footprint of the building, the equipment support pads (if any), the entrance pads or the frost walls and Influence Area of the Foundations shall include stripping and removal of all Topsoil, Asphalt Pavements, Roots, Concrete, Organic Matter, Building Rubble, abandoned utilities and any other deleterious materials (denoted as unsatisfactory materials) to suitable subgrade. If remnants of any former structures are disclosed during site preparation, they shall be removed in their entirety beneath the area within the footprint of the building addition, the equipment support pads, the entrance pads or the frost walls and Influence Area of the Foundations unless shown otherwise. The removals shall take place in the presence of the Inspecting Professional Geotechnical Engineer (IPGE) who will verify satisfactory removals have been completed.
- D. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- E. Refer to the Article 1.06.F for additional information related to an instrument survey of exposed Rock Surface Contours. If rock is encountered within the influence area of the building footprint following stripping and removal of all existing asphalt, concrete, top soil and surficial organic or other deleterious / unsuitable existing materials before reaching the intended design bearing depths, the Contractor shall notify the Owner's designated On-site Representative and A/E for additional direction before proceeding.
- F. Refer to Article 2.01.A for additional criteria associated with removal and replacement of Existing Unsuitable Soil Materials.

- G. The excavated existing on-site material shall be stockpiled as directed by the Owner's on-site Representative for consideration and testing for re-use as Common fill material. Approval for re-use shall be by the Inspecting Professional Geotechnical Engineer (IPGE) who shall be responsible for verify conformance with the referenced specifications and who shall determine if the material is suitable for re-use anywhere on-site. All unsuitable material that cannot be re-used shall be removed from the site and shall be legally disposed of.

Stockpile imported borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

- H. Notify the Architect or the Owner's designated On-site Representative and the Testing Agency when excavations have reached required subgrade.
- I. The contractor shall follow all excavation safety practices as mandated by 29 CFR Part 1926 (OSHA) and all applicable state and local regulations.
- J. Following stripping and removal of all unsuitable or unstable existing materials within the footprint of the building, the equipment support pads (if any), the entrance pads or the frost walls and influence area of the foundations to planned subgrade elevations, the exposed subgrades below the building slabs and footings shall be compacted as required to densities in excess of 95% of the maximum dry density as determined by ASTM D 1557 (Modified Proctor) or directed by the Inspecting Professional Geotechnical Engineer (IPGE).

The exposed subgrades in all areas to receive slabs on grade and new foundations shall be proof-rolled. If placement of Imported Select Granular Structural Fill is required to raise the subgrade, the exposed subgrades shall be proof-rolled prior to placement of any required Imported Select Granular Structural Fill.

These operations shall be performed in the presence of the Inspecting Professional Geotechnical Engineer (IPGE) who will verify satisfactory compaction and conditions have been satisfied.

- K. If the Inspecting Professional Geotechnical Engineer (IPGE) and the Testing Laboratory determine that any unsatisfactory, soft, loose, unstable or non-uniform response areas of soil is present, continue excavation and replace with compacted imported granular fill as directed.

1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

- L. It is the intent of the compaction effort and continuous monitoring procedures to insure that all exposed subgrades disturbed during the normal stripping and excavation procedures are adequately compacted such that they exhibit predictable soil properties and load carrying capacities of the underlying existing undisturbed subgrades.
- M. As required, any mass fill procedures performed within the building / equipment pad and influence area shall only commence following completion of the compaction and proof-rolling procedures and receipt of written approval of the subgrade from the Inspecting Professional Geotechnical Engineer (IPGE).
- N. The contractor shall protect all exposed and prepared subgrades and foundation soils against freezing temperatures or frost. The required means and methods of protection shall include, but is not limited to, use of insulating materials as necessary.
- O. If required or shown on the drawings, the Contractor shall reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect or the Owner's designated On-site Representative.
- P. If on-site Silty and / or Clayey soils and / or flowing sandy and / or other unstable soils are

encountered during excavation, these soils tend to be poorly drained and water sensitive. Footing bearing grades which appear firm immediately after exposure, can become saturated, soft, and muddy in the presence of water and construction traffic (even underfoot traffic). If encountered, the Contractor shall protect and maintain the integrity of all exposed subgrades and shall exercise additional care regarding the exposed silty or running sandy soil subgrades. **As shown on the Contract Documents** or if encountered or, the Contractor shall provide a crushed stone pad and soil separation fabric to protect the integrity of the exposed soil footing subgrade bearing grades during footing excavations.

The Crushed Stone Pad under Footings shall consist of Imported borrow soil material meeting the quality and gradation requirements of a "Crusher Run Limestone" or 50/50 Blend of NYS DOT Size Designation Number 1 and Number 2 Stone (with 100 percent Fractured Faces), placed over tested and approved compacted firm and stable undisturbed natural material or newly placed compacted and approved imported select granular structural fill foundation subgrades and shall extend a minimum of 6-inches wider than the footing. A soil separator fabric (such as Mirafi 140 N or approved equal) shall be used to separate the Crushed Stone from the surrounding soils. The moisture content of this material shall be adjusted prior to application of compaction such that it is within 2% of Optimum Moisture Content as established by the Inspecting Professional Geotechnical Engineer (IPGE) and testing laboratory

In addition to the standard level of care to protect all exposed subgrades and foundation soils against the construction traffic and weather, including protection of soils against freezing temperatures or frost with protective insulating materials as necessary, the Contactor is also responsible for the following to protect and maintain the bearing grades.

Prior to placement of the crushed stone pad, the exposed footing subgrade soils shall be compacted with a minimum Wacker DPU 6055 vibratory plate tamper, or equivalent, under the direction of the Inspecting Professional Geotechnical Engineer (IPGE). The purpose of the compaction is to compact the soils loosened during foundation excavations and to provide a uniform bearing surface over the entire foundation subgrade.

The crushed stone pad shall be installed in a maximum of 12-inch lifts, with each lift compacted with four (4) overlapping passes of a dual-drum walk behind vibratory roller, a Wacker DPU 6055 vibratory plate tamper, or equivalent, under the direction of the Inspecting Professional Geotechnical Engineer (IPGE). The purpose of the crushed stone pad is to provide a stable working surface and dewatering media if ground or surface water enters the excavation.

- Q. As necessary to raise the existing grades to achieve planned subgrade elevations, Imported Select Granular Structural Fill material shall be used to raise the grades to the required elevations within the building pad and influence area. Prior to placement of the Select Granular Structural Fill to raise grades, the exposed subgrades shall be properly prepared, proofrolled, inspected and approved by the Inspecting Professional Geotechnical Engineer (IPGE).

The Imported Select Granular Structural Fill to raise grades shall be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceed with each lift upward and outward from the lower lift. The compacted lift thicknesses shall not exceed compacted thickness as defined in Article 3.11 "Compaction of Backfills and Fills" with each lift moisture adjusted to within 2% of optimum moisture content and compacted to 95% of maximum dry density as determined by ASTM D1557 (Modified Proctor). Full-time monitoring of the select granular structural fill placement, in-place density testing and measurement of lift thickness is mandatory to verify that all fill placed under this program meets minimum structural requirements and design parameters.

When test results indicate insufficient compaction has been obtained in any layer, the Contractor shall take corrective action to modify or alter the moisture content of the soils, to provide additional compaction or otherwise increase the in-place soil density before proceeding with the next lifts. If the Contractor cannot obtain satisfactory compaction due to

material properties, the Contractor shall remove the unsatisfactory material and replace with new material.

Materials which are frozen or which have been contaminated by mud, debris, and/or any other deleterious materials shall be removed and replaced with uncontaminated specified material. Refer to Article 3.11, "Compaction of Backfills and Fills" for in-place density testing requirements before proceeding with subsequent lifts and for additional requirements not specified here

- R. Refer to Contract Drawings for addition information regarding site preparation and approval of subgrades, if required.

3.02 GROUND WATER OBSERVATIONS AND DEWATERING

- A. As indicated on the Referenced Geotechnical Report, groundwater level observations and measurements are made by the drilling field crew when groundwater accumulates in the Borehole. The field crew notes the water level inside the borehole during advancement and following casing (auger) removal. They also note the visual appearance of the moisture condition of the samples as retrieved. The condition and time of groundwater level observations are unique to each Boring, time and date, and are recorded on the individual Test Boring Logs.

During drilling activities, the Referenced Geotechnical Report indicates groundwater was observed in Borings SB-1, SB-2, and SB-4 at about 12 to 17 feet below grade, corresponding to about elevations 692 to 694 feet. Groundwater was not observed in Boring SB-3 during the short drilling period. Wet soils were sampled starting from about 8 feet from grade in Borings SB-1 and SB-4, corresponding to about elevations 696 to 699 feet.

The depths of subsurface water levels will vary by area and will fluctuate based on seasonal and climatic variations, changes in surface runoff patterns, construction activities, and development of the site and the time of year in which construction occurs.

- B. The Contractor shall provide dewatering systems prior to commencing with excavations. The dewatering systems shall prevent surface water, ground water and subsurface perched water from entering all excavations, from ponding on prepared subgrades, and from flooding the Project Site and surrounding areas.
- C. All Excavations shall be made and maintained in-the-dry until satisfactorily backfilled. Any groundwater encountered shall be lowered to at least 2-feet below the approximate excavation prior to commencing the excavation. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation. See Article 3.01, "Preparation" for additional information.
1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. It is anticipated that common sump and pump methodology should be able to be used as a satisfactory means and method of temporary dewatering at the Project Site. Sumps shall be strategically located outside the Influence Area of the Foundations and shall be monitored at all times for effectiveness to control water. The Contractor shall maintain these systems until dewatering is no longer required.

3.03 EXPLOSIVES

- A. Explosives: Use of explosives, including for removal of Rock, is strictly PROHIBITED.

3.04 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials and obstructions. No change in the Contract Sum or Contract Time will be authorized for rock excavation or removal of obstructions without written authorization to proceed from the Owner's designated On-site Representative and A/E before proceeding.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Ram hammering; or ripping of material not classified as rock excavation is earth excavation.
 3. Rock excavation includes removal and disposal of rock. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions.
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 8 inches beneath bottom of concrete slabs-on-grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.05 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

Refer to Article 3.01 "Preparation" for additional information on preparation of exposed subgrades and to Article 3.06 "Approval and Compaction of Existing Subgrades for Structure Support Foundations" for compaction requirements of exposed subgrades.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

Following excavation to planned subgrade elevations, the exposed subgrades below the building slabs and footings shall be compacted as required to densities in excess of 95% of the maximum dry density as determined by ASTM D 1557 (Modified Proctor) or directed by the Inspecting Professional Geotechnical Engineer (IPGE)

Refer to Article 3.01 "Preparation" for additional information regarding over-excavation and compaction requirements to install a 12-inch thick layer of "Crusher Run Limestone" or 50/50 Blend of NYS DOT Size Designation Number 1 and Number 2 Stone (with 100 percent Fractured Faces) under the footings **as shown on the Contract Documents** or if required by field conditions.

2. All foundation excavations shall be maintained in-the-dry. Note that excavation levels may be current groundwater levels. Refer to Article 3.02, "Dewatering" for additional information.
3. All disturbed soil and organic-rich soils below design bearing grade shall be over-excavated to firm, undisturbed, suitable grade. Fill all over-excavation with compacted Select Granular Structural Fill.
4. The Inspecting Professional Geotechnical Engineer (IPGE) must examine, test and verify design bearing pressure for all footings and foundations at the time of excavation and prior to placement of foundation formwork and reinforcing steel. Notify and schedule the IPGE at least one business day prior to commencing any foundation excavation.
5. All footing bearing surfaces shall be dry and free of mud, water and loose or frozen soil.
6. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

3.06 APPROVAL, PROOF-ROLLING AND COMPACTION OF EXISTING SUBGRADES FOR STRUCTURE SUPPORT FOUNDATIONS

- A. Notify Architect, Owner's designated On-site Representative, Inspecting Professional Geotechnical Engineer (IPGE) and Testing Agency when excavations have reached required subgrades.
- B. Refer to Article 3.01 "Preparation" and Article 3.05 "Excavation for Structures" for requirements and information on preparation of exposed subgrades and proof-rolling requirements.
- C. If the Inspecting Professional Geotechnical Engineer (IPGE) and Testing Agency Laboratory determines that unsatisfactory soil is present, continue excavation and replace with compacted Imported Select Granular Structural Fill as directed.
 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect or Owner's designated On-site Representative.
- E. Refer to Contract Drawings for addition information regarding site preparation and approval of subgrades.

3.07 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect or Owner's designated On-site Representative.
 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect or Owner's designated On-site Representative.

3.08 STORAGE OF SOIL MATERIALS

- A. Excavated existing on-site material shall be stockpiled as directed by the Owner's Representative for consideration and testing for re-use as on-site fill material. If the excavated existing materials are deemed to be unsuitable for reuse, the Contractor shall remove the

unsuitable materials for the site and legally dispose of them.

- B. Stockpile imported borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.09 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, perimeter insulation, and foundation drainage systems.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspect, compact, and test foundation subgrades. Obtain approval from testing agency.
 - 4. Inspecting and testing underground utilities.
 - 5. Removing concrete formwork.
 - 6. Removing trash and debris.
 - 7. Removing temporary shoring and bracing, and sheeting.
 - 8. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Levels of Backfill against foundation walls shall not differ by more than 2'-0" on either side of walls, unless walls are adequately braced or all floor framing is in place, up to and including grade level slabs.

Backfilling operations against foundation walls shall wait a minimum of seven (7) days after placement of concrete or until concrete has attained the specified concrete 28-day compressive strength, verified by test results performed by the Testing Agency.

3.10 SOIL FILL

- A. Preparation: The subgrades of areas to receive Imported Select Granular Structural Fill, Granular Fill or backfill materials shall be properly prepared and inspected prior to placement of fill. Refer to Article 3.01, "Preparation" for additional requirements.
- B. Fill materials shall be placed on satisfactory and approved subgrade in a manner to minimize segregation. Fill procedures shall only commence after approval of existing subgrades as defined under Article 3.06 "Approval and Compaction of Existing Subgrades for Structure Support Foundations".
- C. The fill should be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift.
- D. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- E. Place Soil Fill on subgrades free of mud, frost, snow, or ice.
- F. Refer to Article 3.11, "Compaction of Backfills and Fills" for additional requirements.

3.11 COMPACTION OF BACKFILLS AND FILLS

- A. The grade to receive fill shall be dry, firm and stable, free of mud, water and loose or frozen material. The grade shall be proofrolled or probed, inspected and deemed satisfactory by the IPGE prior to placement of fill.
- B. Backfill and fill material shall be placed on a satisfactory and approved subgrade in a manner to minimize segregation. The fill should be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift. See Table 2 below for compacted lift thicknesses.
- C. The moisture content of the material shall be adjusted prior to application of compaction such that it is within 2% of the Optimum Moisture Content. This procedure may involve adding water when the fill material is too dry or discing and aerating to reduce moisture when the fill material is too wet.
- D. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- E. The compacted lift thicknesses and minimum in-place field densities shall conform to the requirements of Table 2 below. Soil in-place density shall be determined using a nuclear density gauge in conformance with ASTM D2922 and D3017. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557, Modified Proctor:

Table 2: Compaction & Lift Thickness Requirements		
Minimum In-Place Density *	Maximum Loose Lift Thickness (inches)	Fill Area Description
95%	6"	Backfill Against Foundation Walls
95%	12"	Below Footing Grades, Confined Areas
95%	12"	Building Pad mass fill areas and subbase course
* As determine using ASTM D1557, Modified Effort Proctor		

- F. When the test results indicate that insufficient compaction has been obtained in any layer, the Contractor shall take action to modify or alter the moisture content of the soil, to provide additional compaction or otherwise to increase the in-place soil density. If the Contractor cannot obtain satisfactory compaction due to material properties, the Contractor shall remove the unsatisfactory material and replace with new material.
- G. Materials contaminated by mud, debris, organics, and/or other deleterious materials shall be removed and replaced with uncontaminated specified material.
- H. No Fill material shall be placed over an area or lift of Fill that has not been tested and achieved satisfactory results.

3.12 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.14 DRAINAGE FILL COURSE

- A. Under slabs supported on-grade, place drainage course on prepared subgrade and as follows. Refer to Article 3.01, "Preparation" for additional requirements.
 - 1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D1557, Modified Proctor.
 - 2. When compacted thickness of drainage course is 8 inches or less, place materials in a single layer.
 - 3. When compacted thickness of drainage course exceeds 8 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a Special Inspector and qualified Testing and Inspecting Agency to perform field tests and inspections and prepare test reports. Refer to Section 01 45 33 "Code-Required Special Inspections and Procedures" for additional information. Sampling and testing for quality control may include those specified in this Article.
- B. The following Required Minimum Soil Special Inspections during Construction shall be as follows:
 - 1. During Building Pad Preparation, the Inspecting Professional Geotechnical Engineer (IPGE) shall verify that excavations are extended to proper depth and have reached proper material. The frequency of this Special Inspection shall be Continuous during Excavation.
 - 2. Prior to placement of compacted fill, the Inspecting Professional Geotechnical Engineer (IPGE) shall inspect subgrade, verify that site has been prepared properly and witness the proofroll (or probe subgrade). The frequency of this Special Inspection shall be Continuous prior to placement of compacted fill.
 - 3. Perform classification and testing of compacted fill materials. The frequency of this Special Inspection shall be Continuous during the Building Earthwork operations.
 - 4. The Inspecting Professional Geotechnical Engineer (IPGE) shall verify use of proper materials, densities and lift thicknesses during placement and compaction of structural fill. The frequency of this Special Inspection shall be Continuous during fill installation. Perform 1 In-Place Field Density (IPFD) test per 2,000 square feet per lift, 1 IPFD per 30 lineal feet of trench or wall per lift per side.
 - 5. The Inspecting Professional Geotechnical Engineer (IPGE) shall inspect all foundation undercut grade, verify that excavations have reached satisfactory bearing material, and approve undercut grade. Witness placement and compaction of footing grade undercut backfill and approve bearing grade (verify Presumptive Soil Bearing Pressure). The frequency of this Special Inspection shall be Continuous during foundation excavation.

- C. The Contractor shall allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect or Owner's designated On-site Representative.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Pad Areas (Open Areas): At subgrade and at each compacted fill and backfill layer, at least 1 test for every 500 sq. ft. or less of paved area or building pad, but in no case fewer than 3 tests.
 - 2. Spread footings: One passing in-place density test at each compacted lift for each spread footing, but no fewer than 2 tests.
 - 3. Continuous Footings: One passing in-place density test at each compacted lift for every 25 linear feet of continuous footing and drive lanes, but no fewer than 2 tests.
 - 4. Foundation Wall Backfill (trenched / restricted areas): At each compacted backfill layer, at least 1 test for each 25 feet or less of wall length, but no fewer than 2 tests.
 - 5. Trench Backfill (restricted areas): At each compacted initial and final backfill layer, at least 1 test for each 25 feet or less of trench length, but no fewer than 2 tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect or Owner's designated On-site Representative; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 31 22 01

SITE EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of site earthwork and site grading is shown on the drawings.
- B. Site earthwork includes, but is not limited to, the following:
 - 1. Fill Materials
 - 2. Source Quality Control
 - 3. Shoring, Bracing and Supporting
 - 4. Horizontal and Vertical Layout
 - 5. Grading and Excavation
 - 6. Compacted Backfill and Fill
 - 7. Field Quality Control Testing and Inspection Services
 - 8. Guarantee
 - 9. Clean Up
- C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 12 01 - Site Preparation
- B. Section 31 25 01 - Erosion, Sediment and Pollution Control
- C. Section 33 40 01 - Storm Drainage

1.03 REFERENCES

- 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; American Association of State Highway and Transportation Officials
- B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- C. ASTM D 75 - Practice for Sampling Aggregates
- D. ASTM D 422 - Particle-Size Analysis of Soils (without Hydrometer Analysis)
- E. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³)
- F. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³)
- G. ASTM D 2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)
- H. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

- I. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- J. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- K. ASTM D 6938 - In Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods
- L. ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- M. ASTM D 5084 - Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
- N. Occupational Health and Safety Administration Regulations and Standards
- O. American Sports Builders Association (ASBA): Sports Fields - A Construction and Maintenance Manual, latest edition
- P. ASTM F2898-11 – Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-Confined Area Flood Test Method

1.04 SUBMITTALS (See Section 31 12 01, 1.05)

- A. Furnish name of New York State licensed Land Surveyor to be employed and perform project layout. Obtain Architect's approval prior to performing work.
- B. Submit written report on NYS licensed Land Surveyor's letterhead verifying that professional's involvement with the project layout. The report shall briefly state the scope of services performed for the project, the dates work was accomplished and an explanation of any adjustments required, specifically listing as-built and FIELD VERIFY requirements as noted in 3.02 of this specification section.
- C. Provide Earthwork Contractor's experience requirements as indicated in 1.05, "Quality Assurance". Obtain Architect's approval prior to performing work.
- D. Samples: 10 lb. samples of each type of fill; submit in airtight containers to testing laboratory.
- E. Materials Sources: Submit name of imported materials source for each type of fill material.
- F. Fill Composition Test Reports (Imported and Onsite): Provide results of laboratory tests (less than 2 months old) on proposed and actual materials used to determine acceptability. This shall include:
 - 1. One optimum moisture-maximum density curve (Modified Proctor) for each soil/imported fill type as determined by ASTM D1557, Method A, latest issue.
 - 2. Sieve Analysis - ASTM D422
 - 3. Moisture Density Relationship - ASTM D1557, Method C / ASTM D698
 - 4. Plasticity Index - ASTM D4318
 - 5. Soundness Test - ASTM C88
 - 6. Soil Classification - AASHTO and ASTM D2487

- G. Compaction Density Test Report(s) required in Field Quality Control of this specification.
- H. Contractor's NYS Licensed Professional Engineer's layout and design calculations of sheet piling and shoring required.

1.05 QUALITY ASSURANCE

- A. Perform all site earthwork, site grading and excavation in compliance with requirements of governing authorities having jurisdiction, OSHA Standards, and "References" in this project specification.
- B. The Owner will employ a licensed soil testing and inspection service for Field Quality Control Testing of materials. This Contractor will coordinate day to day scheduling with the Owner's testing agency for conformance with "Field Quality Control Testing and Inspection Services" in this project specification.
- C. Earthwork Contractor Experience Requirements: Submit business name, business Owner(s) name(s), business address, telephone number, website and/or email address signed by the Contractor/Subcontractor who meets the qualifications set forth in this specification and is proposed by the Contractor to perform the Earthwork for this Project. Provide a list of at least four (4) Earthwork projects of comparable size, scope and quality completed successfully by the proposed Contractor/Subcontractor within the past three (3) years that includes the date completed, project Owner's name and current contact information, including telephone numbers and email addresses.
- D. Layout Foreman Experience: The Earthwork Contractor must provide a competent layout foreman skilled in this specific type of layout/earthwork project. The layout/earthwork foreman shall have a minimum of four (4) similar projects completed within the last three (3) years. Provide a list of projects layout/earthwork foremen has completed including project name, address, Owner contact information and project scope of work.

1.06 JOB CONDITIONS

- A. Job conditions in Section 31 12 01 apply.
- B. Provide sufficient quantities of fill materials to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- C. When fill materials need to be stored on site, locate stockpiles where directed by Owner.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination of material types.
 - 3. Protect all stockpiles from erosion and deterioration of materials by covering with plastic sheets, tarps or as directed by the Architect.
- D. Moisten or dry, fill or backfill materials, to the proper moisture content as determined in accordance with ASTM D1557, Method C in order to obtain proper compaction as indicated.

1.07 SUB-SURFACE SOIL INFORMATION

- A. Geo-technical Report/Data has not been provided by the Owner. Test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner, provided such operations are acceptable to the Architect and Owner. Coordinate test locations with Owner prior to starting work. Backfill immediately when completed and repair to satisfactory conditions as determined by the Architect. It is expressly understood that the Owner, Architect, Landscape Architect, and Consulting Engineers are not responsible for interpretations or conclusions drawn therefrom by the Contractor.

1.08 UNUSUAL SUBSURFACE CONDITIONS

- A. Notify the Architect immediately in writing via email when unusual conditions are encountered during excavation, including, but not limited to: excessive flooding, miscellaneous structures, uncharted or unlocated utilities, foundations, bed rock, toxic and hazardous materials and chemicals (such as muriatic acid and atrizene), suspected archaeological artifacts, and unsatisfactory soil materials. Request clarification from the Owner's Representative or Architect before proceeding. Refer to paragraph 3.4 of this specification.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Satisfactory General Earth Fill:

1. To be used at least 5'-0" outside of structural elements and retaining walls.
2. Satisfactory general earth fill shall be satisfactory on-site subsoil, or hauled in off-site subsoil free of toxics, hazardous wastes and chemicals (such as, but not limited to, atrizene and muriatic acid) that may be injurious to humans, animals and plant materials. Satisfactory earth fill shall also be free of rubbish, debris, wood, masonry, metal, frost, vegetation, organics or other deleterious material, which cannot be properly compacted. Use satisfactory general earth fill that is dry and free of clay. Rocks, gravel or soil shall not be larger than 3" in any dimension/direction.
3. Satisfactory earth fill materials are also defined as those complying with the American Association of State Highway Transportation Officials (AASHTO), M-145 soil classification Groups A-1, A-2-4, A-2-5, A-3 and Unified Soil Classification System GW, GP, GM, GC, SW, SP, SM, and SC (or a combination of these group symbols) as determined by ASTM D2487.
4. Spoils from site earthwork, trenching and building excavations shall be considered satisfactory general earth fill.

B. Imported Granular Backfill:

1. Imported granular backfill to be used for asphalt pavement subbase, concrete subbase, storm structures, storm pipes, water pipes, sanitary manholes, sanitary pipes, other structures, and where indicated on the drawings.
2. Backfill shall be run of crusher limestone meeting the following gradation as determined by ASTM-C136:

<u>Standard Sieve Sizes</u>	<u>Percent Passing By Weight</u>

2" or 50 mm	100%
3/4" or 19 mm	75 - 90%
1/4" or 6.3 mm	25 - 60%
#40 or 0.425 mm	5 - 40%
#200 or 0.075 mm	0 - 8%

3. Backfill shall be free of debris and deleterious materials. In no case shall the plasticity index exceed 5.0 or the percentage passing the 200 mesh sieve exceed 8%. The quality of the imported granular backfill shall be determined by the magnesium sulfate soundness test, if considered suspect by the Architect or Geotechnical Engineer. The maximum percent loss at four cycles by weight shall be 20.

C. Imported Structural Fill:

1. Imported structural fill to be used in areas of structural elements, for top eight (8") inches of design subgrade elevation for running track, field events, tennis courts, synthetic turf fields and where noted on the drawings.
2. Shall be run-of-crusher gravel free from organic matter or other deleterious materials, meeting the material gradation requirements of Item 304.05 Sub-base Course, Type 4, of the NYSDOT's Standard Specifications for Construction Materials, as determined by ASTM C136.

<u>Standard Sieve Sizes</u>	<u>Percent Passing By Weight</u>
2" or 50 mm	100%
1/4" or 6.3 mm	25 - 60%
#40 or 0.425 mm	5 - 40%
#200 or 0.075 mm	0 - 8%

3. Imported structural fill shall be accepted on the basis of gradation, soundness, plasticity index and a well-defined Moisture-Density Relationship Curve. Imported structural fill to be placed within 8" of final exterior subgrade shall be subject to Soundness requirements. Soundness shall be less than 30% loss based on a four-cycle magnesium sulfate soundness test. Plasticity Index of that portion of fill material passing the No. 40 mesh sieve shall not exceed 5.0.

D. Stormwater Management Trench (SMT) Backfill:

1. Shall be No. 1 clean, washed, crushed stone or crushed gravel meeting the following gradation as determined by ASTM C136:

<u>Standard Sieve Size</u>	<u>Percent Passing By Weight</u>
1" or 25.0 mm	100%
1/2" or 12.5 mm	90-100%
1/4" or 6.3 mm	0-15%

2.02 UNSATISFACTORY SOIL MATERIALS

- A. Shall be defined as soil with high percentage of decomposed rock, sand, organic matter or moisture laden clay to prevent adequate compaction. Also, soil with toxics, hazardous

wastes and chemicals (such as atrazine and muriatic acid) that may be injurious to humans, animals and plant materials. Also, soil with significant quantities of rubbish, debris, wood, masonry, metal, frost or other deleterious material which, in the opinion of the Geotechnical Engineer, Owner's Representative, and Architect, cannot be properly compacted shall be classified as unsatisfactory.

- B. Unsatisfactory soil materials are defined as those described in AASHTO M-145, soil classification, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 with CBR value less than 7.0. Also Unified Soil Classification System ML, CL, OL, MH, CH, OH as determined by ASTM D2487 (or a combination of these group symbols) with CBR value less than 7.0 in addition to peat (PT) and other highly organic soils, cobbles, boulders; and soil materials, of any classifications that have a moisture content at the time of compaction beyond the range of 1% below and 3% above the optimum moisture content of the soil material/backfill material, as determined by the Moisture Density Relationship test.
- C. When unsatisfactory soil materials are encountered at proposed subgrades and other design elevations, proceed as described in Part 3 (Execution) of this Section.
- D. When excavated materials become unsatisfactory as a direct result of the Contractor's work, this shall result in the rejection of the unsatisfactory soil materials by the Architect.
- E. The use of slag (a byproduct of metal processing) or recycled/crushed concrete is unacceptable for any use on this project site.

2.03 SOURCE QUALITY CONTROL

- A. See "Submittals" and "Quality Assurance" of this specification section for general requirements for testing and analysis of soil and fill materials.
- B. Where fill materials are specified by reference to a specific standard, Contractor is responsible to test and analyze all samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest until approved.

2.04 SHORING, BRACING AND SUPPORTING

- A. Shoring and bracing shall conform to the requirements of the Occupational Health and Safety Act.
- B. Shoring and bracing shall be provided, placed and maintained at the locations and elevation that are necessary or required to: support and protect the sides and bottom of the excavation; prevent undue disturbance or weakening of the supporting materials below or beside the works; prevent movement of ground which may disturb or damage the work, adjacent pavements, property, structures or other works.
- C. Provide materials for shoring, bracing and supporting, such as sheet piling, uprights, sheathing, stringers and cross-braces, in good serviceable condition. Use timbers that are sound and free of large or loose knots.
- D. Provide design by Contractor's NYS Licensed Engineer, when shoring is required to perform work as shown on the drawings. Submit to Architect for approval.
- E. Installation: Shoring and bracing shall be driven and placed so that it can be removed as backfilling takes place without damage to the pipeline or its appurtenances, structures, and without settlement of or damage to adjacent pavements and structures.

- F. Removal: The Contractor shall remove all shoring and bracing as the excavation is backfilled, unless directed by the Architect to be left in place. The procedure for extracting shoring and bracing and placing backfill shall ensure the backfill load is applied gradually and disturbance of the works or foundation material is avoided.
- G. Support all utilities as required by the municipality/utility owner.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify field conditions such as bench marks, monuments, topography, inverts, locations of utilities and property lines before proceeding. Notify the Architect immediately, in writing, of discrepancies prior to commencing work. Commencement of work will be construed as complete acceptance of survey and layout information. Additional costs resulting from failure to verify field conditions prior to commencing work shall be borne by this Contractor and at no additional cost to the Owner.

3.02 LAYOUT

- A. Stake layout up to and including those elevations and dimensions specifically noted on drawings as "FIELD VERIFY" (FV). Ensure that the field elevation and dimension agrees with the elevation and dimension on the drawings before continuing. Notify the Architect immediately, in writing, of any discrepancies prior to commencing work. Additional costs resulting from failure to verify dimensions as noted on drawings shall be borne by this Contractor and at no additional cost to the Owner.
 - 1. Assume sole responsibility for the accuracy of the layout work.
 - 2. Run from point(s) of beginning (POB), base lines, property monuments, bench marks, iron survey pins, or other points given on the drawings.
 - 3. Roads, Parking Areas, and Walks: Accurately locate and stake curblines, center line, swales, point of curve and tangency as necessary to accurately build.
 - 4. Building and Site Features: Accurately locate and stake corners, offset corners, slopes, and center lines as necessary to accurately build.
 - 5. Pipe Work: Accurately locate with laser.

3.03 GRADING

- A. Cut and Fill: Presume the earthwork does **NOT** balance on site. Meet the grades shown on the drawings. Haul in or haul away as may be necessary. Provide earthwork calculations, and provide for imported or exported material as part of bid. No additional costs will be allowed.
- B. Grade areas as indicated, including transition areas, with uniform levels and slopes between finish elevations.
- C. Cut to grades and profiles indicated.
- D. Set grade stakes at fifty foot (50') intervals, at corners, and breaks in grade.

- E. Conduct operations to avoid ponding of water. Provide all pumping equipment, sump pits, and temporary diversion swales where and when necessary to continue work performance on schedule and as specified.
- F. Shape subgrade surface of site elements to within 0.10' above or below required subgrade elevation, compacted as required and sloped to provide drainage as shown on the drawings. Notify Architect and Geo-Technical Engineer for subgrade review prior to continuing work.
- G. Shape subgrade surface of athletic fields and track areas using laser plane control system for grading of subgrade elevation to ensure accuracy in grade tolerances of +0" to - ¼" in 10' any direction. Compact as required and sloped to provide drainage as shown on the drawings. Notify Architect and Geo-Technical Engineer for review prior to continuing work.
- H. Refer to Section 31 12 01 for topsoil requirements.

3.04 EXCAVATION

- A. Remove and legally dispose of material encountered to obtain required subgrade elevations, including pavement, obstructions visible on ground surface, underground structures and utilities indicated to be removed.
- B. Sloping and Benching: Follow OSHA recommendations based on soil type to determine slope configurations. Slope the sides of excavations five (5') feet deep and over to the angle of repose of the material excavated; otherwise, shore, and brace where sloping is not possible either because of space restrictions or stability of material excavated.
- C. Bracing and Shoring:
 - 1. Provide bracing and shoring as required in excavations, to maintain sides and to protect structures from settlement.
 - 2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open. Carry down shoring and bracing as the excavation progresses.
 - 3. Remove shoring and bracing before completion of backfilling except where required for structural support or slope stability.
 - 4. The design, installation, and maintenance of such shoring and bracing required to accomplish the above purpose are the sole responsibility of the Contractor.
 - 5. Follow OSHA recommendations for bracing and shoring.
 - 6. Indemnify the Owner, the Landscape Architect, Architect, and the Consulting Engineers against any action arising from damage to existing structures, utilities or injury to persons resulting from the Contractor's actions or failure to act, in carrying out the intent of this section.
- D. Protections: Protect structures, vegetation, utilities, sidewalks, pavements, and other facilities in areas of work. Barricade and secure open excavations and provide warning lights/signage from dusk to dawn each day.

- E. Extent of Excavations: Excavate for structures to elevations and dimensions shown, extending excavation a sufficient distance to permit placing and removal of other work and for review. Trim bottom to required lines and grades to provide solid base to receive concrete or imported granular backfill material.
- F. Unsatisfactory Soil Materials: When unsatisfactory soil materials, as defined in this specification, are encountered at design elevations, immediately notify the Architect in writing by email or other equally expeditious means. Continue as directed by the Architect and Geo-Technical Engineer. When, in the sole opinion of the Architect, conditions are not a result of Contractor's negligence, additional excavation may be directed by the Architect and paid for as a Change Order on a unit price or negotiated price basis in accordance with Contract Documents. This additional excavation shall be measured each day and verified by the Owner's representative and the Contractor's Superintendent. A daily written accounting, attested by both parties, shall be maintained with copies daily to the Architect. No claim for extra compensation will be considered except through the procedure outlined above. Assume **25 c.y. (twenty-five cubic yards) of undercutting and removals, placement of soil stabilization fabric (SSF) and providing and compacting to 95% density imported granular backfill material in Base Bid.** Unit price provided shall be utilized to add to or delete from this assumed quantity to account for actual quantity encountered.
- G. Unauthorized and Over Excavation: Consists of removal of materials beyond required subgrade elevations or dimensions without specific direction of the Architect or Geotechnical Engineer. Unauthorized or over excavation, as well as remedial work directed by the Architect or Geotechnical Engineer, shall be at Contractor's expense. Fill of unauthorized excavations shall be as follows (all at no additional cost to the Owner):
1. Fill the voids created by the removal of materials beyond indicated subgrade elevations with lean concrete (2000 psi). Or;
 2. Extending the indicated bottom elevation of the concrete footing to the lower elevation. Or;
 3. Adding imported granular backfill material compacted to 95% density to proper design elevation and layout as directed by the Architect. Testing agency to perform compaction testing prior to proceeding.
- H. Dewatering:
1. Contractor shall anticipate seasonal variations of soil moisture content and groundwater in the Base Bid as verified by site investigation indicated in Section 31 12 01.
 2. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
 - a. Surface and ground water shall be intercepted and removed before entering excavations. All necessary measures shall be taken. Earth dikes, ditches, or other devices, if required, shall be constructed to prevent such flows.
 3. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

- a. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - b. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.
 - c. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
4. The Contractor shall at all times provide and maintain proper and satisfactory means and devices (i.e. ditches, temporary pipes, pumps, and/or other temporary construction) for the removal of all water entering the excavations. Water shall be removed as fast as it may collect, in such manner that shall not interfere with the execution of the work or in the proper placing of pipe, structures or other work.
5. Provide and operate sufficient pumping machinery to keep excavated parts free of water. Dig sump pits when necessary into which the excavation shall be drained. Take care and proper precautions in the use of pumps so that in no case will foundations, footings and utilities already in place or existing foundations, footings of adjacent structures or utilities be undermined or disturbed and erosion occur due to pumping.
6. Do not discharge pumped materials into any body of water, wetland, adjacent property, road side swales, subsurface storm systems, or any infiltration practices as determined by the Architect. Provide temporary sediment basins, traps, and filter bags for pumped water.
7. Adjust, repair, replace, or clean all work, surfaces, and property, which may have been affected as a result of any dewatering operation.
- I. Prepare subgrade and twelve (12") inches of existing sub-soils below subgrade elevations in excavated areas to minimum density of 95% in structure, pavement, utility areas, trenches, and 90% under lawn non-paved areas.
- J. Rock and Rock Excavation:
 1. Rock Definition: Shall be defined as solid hard material located in ledges, bedded aggregate deposits and unstratified masses, and all natural conglomerate deposits so firmly cemented as to present all the characteristics of solid rock, which must be removed by pneumatic hammers. Rock does not include shale, slate, soft sandstone, hardpan, masonry or concrete rubble, boulders less than three (3) cubic yards, such other rock material which is decomposed, stratified, weathered or shattered, or any material capable of being removed by a well maintained Caterpillar 225 power shovel, D8 Dozer with Ripper, or Architect approved equivalent.
 2. Rock Excavation Administrative Procedures: When encountered, shall be stockpiled for measurement before removal and paid for on a unit price basis in accordance with Contract Documents. Notify Architect immediately of rock discovery prior to performing any rock removal or continued excavation. Rock excavations as defined shall be measured each day and verified by the Owner's designated representative and the Contractor's on site Superintendent. A daily written accounting, attested to by both parties, shall be maintained with copies daily to the Architect. No claim for extra compensation will be considered except

through the procedure outlined above. Contractor to assume **10 c.y. (ten cubic yards) of rock excavation and removal in Base Bid.** Unit price provided shall be utilized to add to or deduct from this assumed quantity to account for actual quantity encountered.

3. Rock Excavation Removal Procedures: Includes removal and disposal of rock. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions.
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 8 inches beneath bottom of concrete slabs-on-grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
4. Any over excavation due to rock excavation and removal shall be handled as directed under "Over Excavation" in this Section.
5. Contractor has the option to remove existing rock and dispose off-site or crush existing rock and use as satisfactory general earth fill when it meets gradation noted in 31 22 01 for imported granular backfill material.

3.05 BACKFILL AND FILL

- A. Preparation of Ground Surface to Receive Fill: Remove vegetation, organic materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Break up and remove existing foundations, concrete slabs, abandoned utilities, and site features. Plow, strip, roughen, or break up slopes steeper than 1 vertical to 4 horizontal so that fill material will bond to existing surface.
- B. Execute these steps when the existing ground surface, after removal of the above unsatisfactory soil materials, has a density less than that specified under "Compaction" for the particular area classification: Break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to the required depth and percentage of maximum density.
- C. In no case shall fill be placed on a subgrade that is wet, muddy, rutted, spongy, frozen or that contains frost or that has not been tested and approved to achieve satisfactory results.
- D. Areas to receive any fill or backfill should be properly prepared, proof rolled, tested per "Field Quality Control" within this specification, inspected and approved by the Architect and Geo-Technical Engineer prior to the placement of fill.
- E. Following grade approval by the Architect and Geo-Technical Engineer, place imported granular backfill, imported structural fill and satisfactory general earth fill material in layers not more than eight (8") inches in loose depth in a manner to minimize segregation. The fill shall be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift.
- F. Moisture Content: Contractor shall anticipate seasonal variations of all soils (on site or imported) and imported fills moisture content in the Base Bid and timing required for such

shall be included in the project schedule. The moisture content of the materials shall be adjusted prior to application of compaction such that it is no more than 1% below or 3% above the optimum moisture content of the material. Apply water to surface, subgrade or layers of soil material when required to achieve compaction densities stated below. Remove and replace, or scarify and air dry, soils or imported materials that is too wet to permit compaction to specified density.

G. Compaction:

1. Compact each eight (8") inch layer of fill and backfill materials.
2. Compact fill and backfill material below subgrade for structures, slabs, pavements, and utilities to minimum 95% of optimum in place density as determined by ASTM D1557, Modified Proctor.
3. Compact fill material below subgrade for lawns or unpaved areas to minimum 90% of optimum in place density as determined by ASTM D1557, Modified Proctor.

H. Equipment:

1. Use sheepfoot rollers, pneumatic tired rollers, drum rollers, vibrating tampers, and other compaction equipment capable of obtaining the required density throughout the entire layer being compacted.
2. Use power-driven hand tampers for compacting materials adjacent to site structures.
3. For utility trenches or other confined areas, small compaction equipment may be necessary such as a vibratory plate, jumping jack or walk-behind vibratory roller. In these cases, lift heights no greater than six (6") inches should be maintained.

- I. Reconditioning Compacted Areas: Where previously completed compacted areas are disturbed by subsequent construction operations (by any Contractor), traffic or adverse weather, scarify and dry out the surface, regrade, and recompact to the required density prior to further construction at no additional cost to the Owner. Use hand tamping for recompaction over underground utilities and trenches.

3.06 FIELD QUALITY CONTROL TESTING AND INSPECTION SERVICES

- A. Soil Testing Service/Geo-Technical Engineer must inspect and approve density tests, retesting, and proof rolling of subgrades, as described in this section, before further construction work is performed thereon.
- B. Perform compaction density testing on compacted fill and imported granular base course in accordance with ASTM D1556, ASTM D1557, ASTM D2922, and D3017.
- C. In place density testing should be performed at a frequency of one (1) test per 500 square feet per lift in smaller open areas, one (1) test per 2,500 square feet per lift in larger open areas, and one (1) test per 25 feet per lift in confined areas and utility trenches.
- D. When the test results indicate that insufficient compaction has been obtained in any layer, the Contractor shall take action to modify or alter the moisture content in the soil, to provide additional compaction and testing or otherwise to increase the in-place soil density. If the Contractor cannot obtain satisfactory compaction due to material

properties, the Contractor shall remove the unsatisfactory material and replace with new material at no additional cost to the Owner.

- E. Materials contaminated by mud, debris, organics, frost, and/or other deleterious materials shall be removed and replaced with uncontaminated specified material.
- F. No fill or backfill shall be placed over an area or lift of fill that has not been tested and achieved satisfactory results.
- G. Proof Rolling: On pavement subgrades, in cut areas only, unless otherwise directed by the Architect, the only testing required will be the proof rolling as described below:
 - 1. Provide Soil Testing Service/Geo-Technical Engineer with 48 hour advance notification when subgrades are ready to proof roll.
 - 2. Proof Roll the prepared pavement subgrade surface with fully loaded ten (10 c.y.) cubic yard earth moving truck or, in the opinion of the Architect/Geo-Technical Engineer, using a 5-ton smooth drum roller making at least 3 overlapping passes, in each of 2 perpendicular directions, on static mode at a speed of 1 to 4 feet/second. Check for unstable areas. Subgrades that rut, pump or deflect under the truck's tires may be judged unstable by the Architect/Geo-Technical Engineer. These areas may require further compaction or undercutting as directed by the Soil Testing Service/Geo-Technical Engineer.

3.07 GUARANTEE

- A. Guarantee concrete slabs, pavements, curbs, stairs, walls, trenches, utilities, structures, and lawns free from settlement for a period of one (1) year from the date given on the certificate of substantial completion or final punch list when satisfactorily completed and accepted by the Architect, whichever is later.
- B. Repair to proper grade and alignment any and all settlement adversely affected by settlement within one (1) year after date given on the certificate of substantial completion or final punch list when satisfactorily completed and accepted by the Architect, whichever is later, at no additional expense to the Owner. In damaged compacted areas, scarify the surface, re-shape, and compact to required density prior to further construction.
- C. All repairs/corrections shall be completed to the satisfaction of the Owner within seven (7) days of written notice by the Owner.

3.08 CLEAN UP

During the contract and at intervals as directed by the Architect and as earthwork is completed, clear the site of surplus earth, large surface stones, debris, tools and equipment. Leave the site in a clean, safe, well draining, and neat condition.

END OF SECTION

SECTION 31 25 01

EROSION, SEDIMENT AND POLLUTION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide erosion, sediment and pollution controls as shown on the drawings and as directed by the Architect to significantly reduce runoff on downstream and neighboring properties. This includes temporary control measures to mitigate land disruption by other Contractors during construction of this project.
- B. Erosion, sediment and pollution control includes, but is not limited to, the following:
 - 1. Storm structure protection
 - 2. Silt fence
 - 3. Rip rap
 - 4. Off site sediment tracking controls
 - 5. Triangular silt dikes
 - 6. Temporary concrete washout facility
 - 7. Temporary seeding and mulching
 - 8. Permanent seeding and sodding
 - 9. Straw mat
 - 10. Temporary sediment filter bag for pumped water
 - 11. Construction site dust control
 - 12. Spill prevention, reporting and documentation
 - 13. Clean up
- C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.
- D. Code Compliance: The New York State Department of Environmental Conservation requires a SPDES General Permit for Storm Water Discharges from Construction Activity. This Permit GP-0-20-001 is pursuant to the Environmental Conservation Law and has penalties and fines related to violations.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 12 01 - Site Preparation
- B. Section 31 22 01 - Site Earthwork
- C. Section 32 92 01 - Seeded and Sodded Lawns
- D. Section 33 40 01 - Storm Drainage

1.03 REFERENCES

- A. Spill Guidelines Manual (SGM) New York State Dept. of Environmental Conservation.
- B. New York State Standards and Specifications for Erosion and Sediment Control, dated July 2016 or latest edition.

1.04 SUBMITTALS: (See Section 31 12 01, 1.05)

- A. Manufacturer's Data (MPD) are required for:
 - 1. Storm Structure Protection
 - 2. Silt Fence with Net Backing
 - 3. Soil Separation Fabric for Off Site Sediment Tracking Control
 - 4. Triangle Silt Dikes
 - 5. Sediment Filter Bag
 - 6. Straw Mat
 - 7. Spill Response Equipment
- B. Material Certificates (MC) showing content/mechanical analysis and Samples are required for:
 - 1. Rip Rap
 - 2. No. 3 Stone for Off Site Sediment Tracking Control
 - 3. Temporary Seeding and Mulching: Submit seed mix species and mulch source
 - 4. Permanent Seeding & Sodding: (See Section 32 92 01)
- C. Certification Statement: Submit photocopy of Section 31 25 01, 1.07, filled out completely and accurately to the Landscape Architect at the pre-construction meeting.
- D. Listing of emergency contract numbers. This list shall include the name of an Emergency Response Contractor that may be used in certain situations.
- E. Per NYSDEC SPDES Regulations, all onsite contractors performing earth disturbing activities need to have current NYSDEC endorsed 4-hour erosion and sediment (E&SC) training. Provide copies of all onsite personnel certification cards, prior to construction. The document shall be kept on file (by the Contractor) within the onsite SWPPP log book.

1.05 QUALITY ASSURANCE

- A. Perform erosion, sediment and pollution control in compliance with applicable requirements of the New York Standards and Specifications Erosion and Sediment Control Manual, dated July 2016 (or latest edition) or other governing authorities having jurisdiction.
- B. Prevention of erosion and pollution from storm water runoff for the duration of this project is the responsibility of this Contractor. All Storm Water Pollution Prevention control work indicated on the drawings and/or specifications shall be included in this Contractor's Base Bid. Damages resulting from, but not limited to, negligence, improper maintenance or general disregard for erosion control measures shall be immediately corrected by this Contractor to the satisfaction of the Landscape Architect, Engineer, or Certified Erosion Control Specialist hired by the Owner for SWPPP inspections as required by NYSDEC. Damages resulting from other contractors shall be repaired by this Contractor on a time and materials basis and back charged to the responsible party. Any fines levied on the Owner by governing authorities for SWPPP violations shall be back charged to the responsible party.
- C. In the event of a chemical or hazardous spill or release, the individual(s) who caused the spill is responsible for prompt and proper clean-up. If the spill requires cleanup procedures beyond the means of the Contractor, an emergency spill cleanup Subcontractor shall be hired by the Contractor. They shall be utilized when the Contractor does not have the appropriate training, equipment or materials to cleanup the area safely and effectively. This shall be done at no additional cost to the Owner. Any testing and

cleanup required post cleanup shall be provided by the Contractor at no additional cost to the Owner.

1.06 JOB CONDITIONS

- A. Job conditions in Sections 31 12 01, 31 22 01, 32 92 01 and 33 40 01 apply.
- B. Contractor will take all necessary precautions to avoid allowing dust generation that violates NYSDEC regulations and compromises compliance with governing authorities air monitoring plan.
- C. Winter Stabilization Requirement: When construction schedule, regardless of reason, prohibits installation of permanent stabilization measures and site elements, including substantial lawn growth to prevent erosion, this Contractor shall install and provide temporary seeding, mulching, and other preventative/stabilization measures specified and as directed by the Landscape Architect at no additional cost to the Owner.

1.07 CERTIFICATIONS

- A. Authorized, legally responsible signatures for the General Contractor, Site Contractor, Site Earthwork, Landscaping Subcontractor(s) and any other soil disturbing Contractor shall sign and prominently display the following certification statement at the job trailer or office during the life of the project:

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the Storm Water Pollution Prevention Plan (SWPPP) and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

1.	General Contractor	Signature:	_____
		Name:	_____
		Title:	_____
		Address:	_____

2.	Site Earthwork Contr.	Phone No.:	_____
		Email:	_____
		Signature:	_____
		Name:	_____
		Title:	_____

Address: _____

Phone No.: _____

Email: _____

3. Site Landscaping Contr. Signature: _____

Name: _____

Title: _____

Address: _____

Phone No.: _____

Email: _____

4. Other Sub Contractors as determined by the Architect Signature: _____

Name: _____

Title: _____

Address: _____

Phone No.: _____

Email: _____

1.08 NOTICES

- A. The Operator (Owner) shall file with the New York State Department of Environmental Conservation (NYSDEC) a Notice of Intent (NOI) a minimum of ten (10) days prior to start of construction. Unless notified by the NYSDEC to the contrary within ten (10) days, a general SPDES permit is automatically issued which authorizes discharge of storm water on the construction site.
- B. When the site has been finally stabilized, the Operator (Owner) shall file with the NYSDEC a Notice of Termination (NOT).
- C. The Operator (Owner) is responsible for payment of annual fees related to the SPDES permit. Filing of a NOT shall typically terminate the Operator's fee responsibility.

1.09 INSPECTIONS AND MAINTENANCE

- A. The Architect or qualified personnel of the Operator shall inspect disturbed areas of the construction site at least once per week. Special attention will be focused on areas not finally stabilized, structural control measures, point discharge (outlets) and locations where vehicles enter or exit the site. Disturbed areas will be inspected for pollutants entering the drainage system. Structural control measures will be reviewed for effectiveness in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site will be inspected for evidence of off site sediment tracking. A written report of inspections shall be produced in a journal during the construction operations. The journal shall be made available (by the Operator/Owner) for NYSDEC and the general public to review.
- B. The Contractor shall provide timely maintenance of vegetation erosion and sediment control measures, and other protective measures, during construction. Corrective measures must be performed within one (1) calendar day of the Architect's or Operator's (Owner's) report. Failure by the Contractor to perform corrective work within this schedule automatically authorizes the Operator to hire others and backcharge this Contractor. The Architect or Operator will send a letter or email correspondence one (1) calendar day before hiring others and backcharging this Contractor. The Contractor shall keep a written record of maintenance and corrective work in a journal. The journal shall be made available for the Operator, Architect, Landscape Architect, Soil and Water Conservation District, ACOE, and NYSDEC until the site is finally stabilized.
- C. The Contractor shall conduct daily inspections of the equipment staging and maintenance, fueling, hazardous waste staging and waste storage areas to ensure that spill control measures are in place. Stock appropriate clean-up materials whenever changes occur in the types of chemicals used or stored on site.
- D. The Contractor is responsible for having mandatory, up to date NYSDEC endorsed 4-hour erosion and sediment control (E&SC) training all personnel working on site in accordance with the SPDES permit.
- E. The Operator (Owner) shall provide long term maintenance of the storm water facilities after the site is finally stabilized. The designated maintenance personnel shall keep written records and pictures of maintenance and corrective work in a journal. All stormwater discharge points shall be maintained, inspected, and documented. The journal shall be made available for review by the NYSDEC for a minimum period of five (5) years after the Notice of Termination (NOT) has been filed.

1.10 SPILL PREVENTION, REPORTING AND DOCUMENTATION

- A. To minimize the potential for discharge to the environment of oils, petroleum, or other hazardous substances, the following requirements shall apply:
 - 1. All oil, petroleum, or hazardous materials stored or temporarily relocated on site during the construction process shall be stored in a way to provide protection from vehicular damage and to provide containment of leaks or spills. Temporary berms, dikes, storage basins, or similar methods shall be employed as appropriate on site.
 - 2. Refer to Storm Water Pollution Prevention Plan Notes for additional spill prevention good housekeeping practices.
 - 3. Maintain file of Material Safety Data Sheets (MSDSs) or other references for recommended spill clean-up methods and materials.

4. Keep spill response equipment readily accessible.
- B. In the event of a spill contact the Construction Manager, Owner (Operator), and Architect. The Contractor shall also notify all other Contractors working around the area of the spill.
- C. If spilled material has entered any sanitary/storm sewer system then contact the municipality or agency with jurisdiction over the system, in addition to those listed in this section.
- D. The contractor shall be responsible for the initiation of spill reporting and documentation procedures. All petroleum spills must be reported to NYSDEC Spill Hotline at 1-800-457-7362, less than two (2) hours following discovery. All petroleum spills must be reported to NYSDEC unless all of the following apply:

Criteria	Description
Quantity	Must be known to be less than 5 gallons.
Containment	Must be contained on an impervious surface or within an impervious structure. No access to the environment.
Control	Must be under control and not reach a drain or leave the impervious surface.
Cleanup	Must be cleaned-up within two (2) hours of occurrence.
Environment	Must not have already entered into soil or groundwater or onto surface water.

- E. A release of a "reportable quantity"¹ or unknown amount of a hazardous substance must also be immediately reported to the NYSDEC Spill Hotline. Spills of reportable quantities of chemicals or "harmful quantities"² of oil to navigable waters must be reported to the federal National Response Center, 1-800-424-8802 or 1-202-426-2675.

¹ *Reportable Quantity*: Refers to the quantity of a hazardous substance or oil that triggers reporting requirements under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) (USEPA, September 1992).

² *Harmful Quantity*: Includes discharges that violate applicable water quality standards, cause a film, sheen, or discoloration on a water surface or adjoining shoreline; or cause a sludge or emulsion to be deposited beneath the water surface or shoreline (40 CFR 110.3).

PART 2 - PRODUCTS

2.01 STORM STRUCTURE PROTECTION

- A. Shall be a pre-manufactured cylindrical log 12" – 32" in diameter, composed of degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants. Filter socks may be filled after placement by blowing compost into the tube pneumatically or filled at a staging location and moved into its designated location. Both ends of the filter socks shall be secured to prevent opening.
- B. The flat dimension of the sock shall be at least 1.5 times the nominal diameter of the sock.
- C. Compost infill shall be a well decomposed (matured at least 3 months), weed-free, organic matter. Shall be aerobically composted, possess no objectionable odors, and contain less than 1% by dry weight, or manmade foreign matter.
- D. All biosolids compost must meet NYS DEC's 6NYCRR Part 360 (Solid Waste Management Facilities) requirements.

- E. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.
- F. Wood stakes shall be a minimum of 2" x 2" in size. Shall be untreated fir, redwood, cedar or pine and shall be cut from sound timbers. Shall be straight and free of loose and unsound knots or other defects which would render them as unfit for the intended use. Metal stakes may not be used as an alternate. Tops of stakes shall not extend above the top of the fiber roll.
- G. Standard of quality shall be: Diamond SOCK® pre-filled compost filter sock as manufactured by MKB Stormwater Innovation, 888-578-0777; or Architect Approved Equal

2.02 SILT FENCE

- A. Shall be a woven polypropylene geotextile comprised of UV stabilized polypropylene slit film and 1.25" square, non pressure treated, pointed, hardwood posts and net mesh backing for additional support. Standard of quality for silt fence shall be IVI-3611MW as manufactured by Indian Valley Industries, Inc., www.iviindustries.com, (607) 729-5111, or Architect approved equal.

2.03 RIP RAP

- A. Medium: Shall be placed rip rap. Stones conforming to NYSDOT Table 733-21A, Stone Filling Item "Medium". 50% to 100% shall be heavier than 100 lbs. and 0% to 10% may be smaller than 4".
- B. Gradation of rip rap shall be accepted or rejected based on a visual examination by the Architect prior to placing rip rap.
- C. Soil Separation Fabric: Shall commercially manufactured non-woven polypropylene filter fabric. Standard of quality shall be Mirafi 140N as manufactured by NICOLON/MIRAFI GROUP or Architect approved equal.

2.04 OFF SITE SEDIMENT TRACKING CONTROLS

- A. No. 3 stone shall meet the following requirements:

<u>Standard ASTM Sieve Size</u>	<u>Percent Passing by Weight</u>
3"	100
2"	0-15
Passing No. 50	5-10
Passing No. 100	2-5

- B. Soil Stabilization Fabric: Shall be a commercially manufactured, UV stabilized low clogging, high flow, woven geotextile. Standard of quality shall be Mirafi 600X, as manufactured by NICOLON/MIRAFI GROUP, 3500 Parkway Lane, Norcross, Georgia (Tel. 1-800-234-0484) or Architect approved equal.
- C. Granular Base Course Material: Shall be as specified in Section 31 22 01.

2.05 TRIANGULAR SILT DIKES

- A. Silt dikes shall be triangular-shaped, having a height of at least eight to ten inches (8" - 10") in the center with equal side and a eight to twelve inch (8" - 12") base. The

triangular-shaped inner material shall be urethane foam. The outer cover shall be woven geotextile fabric placed around the inner material and allowed to extend beyond both sides of the triangle two to three (2' - 3') feet. Standard length of each dike will be seven feet (7') unless otherwise indicated on the plans. The dikes shall be attached to the ground with wire staples.

- B. Wire staples shall be No. 11 gauge wire and be at least six to eight (6" - 8") inches long. Staples shall be placed as indicated on the installation detail.
- C. Standard of Quality shall be Triangular Silt Dike as manufactured by Triangular Silt Dike, Inc., 608 Greenwood Drive, Midwest City, OK 73110, (800) 290-8473.

2.06 TEMPORARY SEDIMENT FILTER BAG FOR PUMPED WATER

- A. Provide prefabricated bags/pouches with nonwoven geotextile fabric. The standard of quality shall be Dirtbag as manufactured by ACF Environmental, 800-448-3636 or Architect approved equal.
- B. Provide wooden pallet to set filter bag on for ease of disposal.

2.07 TEMPORARY CONCRETE WASHOUT FACILITY

- A. Concrete washout facility to fully contain all concrete washout needs of the entire project and all contracts.
- B. Concrete washout facility shall be temporary straw bales that are lined with a single sheet of a minimum of 10 mil polyethylene sheeting that extends over the entire basin to prevent escape of discharge. Place a secure, non-collapsing, non-water collecting cover over the concrete washout facility prior to inclement weather to prevent accumulation and overflow of precipitation.
- C. Provide concrete washout to prevent discharge from concrete trucks or equipment cleaning to inlets, surface or groundwater.
- D. Concrete washout facility shall be no closer than 50 feet from environmentally sensitive areas such as waterbodies, wetlands, and open drainage facilities and watercourses. Signs shall designate concrete washout facilities.
- E. Ensure that the concrete washout facility complies with all Federal, State and local laws, rules, and regulations. Ensure that the concrete washout facility is in place before delivery of concrete to site.
- F. Provide a sign identifying area as "Concrete Washout" acceptable to the Architect. Maintain throughout the project duration.

2.08 TEMPORARY SEEDING AND MULCHING

- A. Seeding shall be 100% Perennial Ryegrass with no more than 30% of any one cultivar and always at least 2 different cultivars and a 90% germination rate or more.
- B. All seed mixtures to contain 0.5% weed seed or less.
- C. All seed must be fresh seed, not seed that is left over from last year and beyond the sell by date.
- D. Dry mulch shall be clean straw bales.

2.09 PERMANENT SEEDING AND SODDING

Seeding and Sodding shall be as specified in Section 32 92 01.

2.10 STRAW MAT

- A. 100% biodegradable thread on 1.5 inch centers stitched to a 100% biodegradable natural fiber top net. Blanket shall be manufactured with a colored line or thread stitched 2-5 inches from edge to ensure proper overlap. Standard width is 4'-0".
- B. Standard of quality shall be BioNet Blanket as manufactured by North American Green, 1-800-772-2040 or Architect approved equal for the following slope conditions:

<u>Slope Condition</u>	<u>Water Flow Condition</u>	<u>Product Type</u>
4:1 (or flatter)	Low flow (5 fps)	S75BN: Single Net Straw
3:1	Moderate flow (6 fps)	S150BN: Double Net Straw
2:1	Medium flow (8 fps)	SC150BN: Double Net Straw-Coconut (70/30 blend)
1:1 (and greater)	High Flow (10 fps)	C125BN: Double Net Coconut

- C. Stakes: Six inch lengths of 100% biodegradable "T" shaped pin designed to safely secure erosion control blanket. Standard of quality shall be Bio-Stake as manufactured by North American Green or Architect approved equal.

2.11 SPILL RESPONSE EQUIPMENT

- A. The following is a list of recommended spill control material. The contractor is responsible to have spill control and personnel protective equipment readily available for the materials being used. Acquire sufficient quantities and types of appropriate spill control materials needed to contain any spills that can be reasonably anticipated. The need for equipment to disperse, collect and contain spill control materials should be on site at all times.
 - 1. Personal Protective Equipment
 - a. Chemical Splash Goggles
 - b. Gloves
 - c. Boot Covers
 - d. Tyvek Aprons or Suits
 - 2. Absorption Materials
 - a. Spill Pillows and Socks
 - b. Absorbent Booms and Pads
 - c. Dikes for use on rough surfaces
 - d. Storm Structure Covers
 - e. "Loose" Absorbents
 - 3. Tools
 - a. Shovel, Broom, Brush
 - b. Disposal Bags
 - c. Sealing Tape
 - d. Hazardous Waste Stickers
 - e. "Danger" and "Keep Away" Signs
 - f. Five gallon pails or 20 gallon drums with polyethylene liners

- B. Basis of Design shall be provided by: 3M, 888-364-3577; New Pig Corporation, 800-468-4647; SpillKits911, 800-474-5911; Dawg, Inc., 800-935-3294; or Architect approved equal.
- C. Place spill response equipment in a readily assessable location within or immediately adjacent to the project site.

PART 3 - EXECUTION

3.01 SIGNATURE REQUIREMENTS

- A. Between the Pre-Construction Meeting and starting site work, the Contractor shall:
 - 1. Sign the certification statements. Contractor shall prominently display the statements at the job site.
 - 2. Review inspection and maintenance procedures. Decide where journals will be temporarily stored for review by NYSDEC, S&WC, ACOE, Operator (Owner), the Landscape Architect and Architect.
 - 3. Designate specific Owner and Contractor personnel responsible for daily inspection and maintenance. Provide certification cards.

3.02 GENERAL EROSION CONTROL

- A. Install initial construction erosion control features, as indicated on drawings and specifications or as directed by the Architect, prior to topsoil stripping, earthwork, and removal of existing vegetation. Keep the disturbance to a minimum and shall not exceed five (5) acres, unless directed by the Architect. Install other features as described in the sequence of erosion, sediment and pollution control on the drawings.
- B. Start permanent seeding and mulching within seven (7) calendar days of rough grading. When this is not possible for any reason, provide temporary seeding on non-roof, non-paved areas with 100% perennial rye grass at the rate of six pounds (6#) seed per one thousand (1,000 sf) square feet and straw mulching for complete coverage. When adverse weather conditions prevent good germination, repeat seeding and mulching as directed by the Architect until the area is stabilized. Till under temporary grass and fine grade when preparing for final permanent lawn stabilization.
- C. Until a disturbed area is stabilized, trap runoff sediment by the use of sediment debris basins, diversion swales, sediment traps, or other methods acceptable to the Architect and governing authorities. Provide temporary dry mulch (straw) to stabilize exposed soils as directed by the Architect.
- D. Provide erosion controls on slopes and swales traversing, bordering, or leaving the site. Limit the water flow to a nonerosive velocity.
- E. Do not store fill materials within one hundred (100') feet of the banks of any streams or waterbodies, intermittent or perennial.
- F. Inspect erosion and sediment control measures immediately after each rainfall and at least daily during prolonged rainfall. Make required repairs immediately.

- G. Remove sediment deposits when they reach approximately one-half of the height of the barrier. Dispose sediment in a manner that does not result in additional erosion or pollution.
- H. Provide prompt (weekly) removal and disposal of rubbish and debris in accordance with the governing authorities, Owner policies, and good housekeeping measures.
- I. Traffic shall not be permitted to cross filter socks.

3.03 MUNICIPAL SEWER, SWALES AND WETLAND EROSION CONTROL

Control erosion, siltation and pollution to municipal sewers, swales and wetlands by taking appropriate measures such as, but not limited to, the following:

- A. Do not disturb the bed and banks of waterbodies unless specifically shown on drawings. When bed and bank work is shown, obtain permits and proceed with work creating the minimum disturbance necessary to complete the project.
- B. Prevent petroleum products and excessive amounts of silt, clay, and muck from entering municipal sewers, waters, swales or wetlands of New York State during construction.
- C. Prevent fresh concrete, concrete leachate, and washings from equipment and trucks, from entering municipal sewers, waters, swales or wetlands of New York State during construction.
- D. Place silt fence to control erosion at the downslope edge of disturbed areas. This barrier to sediments is to be put in place before disturbance of the ground occurs and is to be maintained in good condition until disturbed land is heavily vegetated or otherwise permanently stabilized.
- E. Seed areas of soil disturbance resulting from this project with appropriate perennial grass seed and mulched with straw within seven (7) calendar days as described in general erosion control. Mulch shall be maintained until a suitable vegetative ground cover is established and as directed by the Architect.

3.04 CONSTRUCTION SITE DUST CONTROL

- A. The Contractor shall prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety issues.
- B. Dust control applies to construction roads, access points, other disturbed areas and stockpiles subject to surface dust movement and dust blowing.
- C. Contractor may use any number and combination of dust control methods, as approved by the Architect. They include:
 - 1. Applying water to haul roads
 - 2. Restricting vehicle speeds to 10 mph
 - 3. Hauling materials in properly tarpped or watertight containers.
 - 4. Covering stockpiles and materials
 - 5. Wetting equipment and work area
 - 6. Mulching
 - 7. Spray adhesives and polymer additives (MSDS sheets required)
 - 8. Barriers and wind breaks

- D. Contractor is responsible for any cleanup and site restoration associated with dust control measures, dust pollution on or off the project site property at no additional cost to the Owner.

3.05 STORM STRUCTURE PROTECTION

- A. Install fiber rolls as detailed around drainage structures and where shown on the plans to protect site elements from silt and sediment.
- B. Filter socks shall be anchored in earth with wooden stakes driven a minimum of 12" into the soil on 4-foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.
- C. Wrapping the storm structure grate with fabric is NOT acceptable, however straw bales may be used.
- D. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the SWPPP. For removal, the mesh can be cut, and the compost spread as an additional mulch to act as a soil supplement.

3.06 SILT FENCE

- A. Locate as shown on drawings and as directed by the Architect. Excavate trench along the lower perimeter(s) of site, along the contract limit line, and as indicated on the drawings. Place excavated material on uphill side of trench for backfilling.
- B. Drive stakes securely into the downhill side of the trench. When prefabricated silt fence with fabric attached to stakes is used, drive stakes so that fabric is buried in the ground as detailed.
- C. Backfill trench with excavated material, so that fabric is securely buried in the ground to prevent undermining. Tamp soil.
- D. Join sections by overlapping fabric between two (2) stakes. Set stakes simultaneously. Overlap by minimum six (6") inches, fold, and staple to prevent sediment bypass.
- E. Attach silt fence securely to stakes spaced no more than eight (8' o.c.) feet on center. Secure fence fabric to stake with minimum three one (1") inch staples.
- F. Toward the end of the project, when site is stabilized and as directed by the Architect, remove silt fence and correct lawn area around removal to a smooth, neat, well-draining condition.

3.07 RIP RAP

- A. Place and install rip rap where shown on drawings. Do not leave jagged, sharp pieces of stone facing up.
- B. Level out stone to provide smooth transition to adjacent finish grades.

3.08 OFFSITE SEDIMENT TRACKING CONTROLS

- A. Install as detailed and shown on drawings to eliminate tracking sediment off site. Inspect after each rain storm and at the end of each work day.

- B. When sediment begins tracking off site, sweep and clean affected roadway immediately and replace stone with clean No. 3 stone to retain sediment on site.
- C. Remove fabric and stone at project completion. Complete construction of proposed final surface(s).

3.09 TRIANGULAR SILT DIKES

Install as detailed and as recommended by the manufacturer.

3.10 TEMPORARY SEDIMENT FILTER BAG FOR PUMPED WATER

- A. Install prefabricated bags/pouches on top of straw bale base as recommended by the manufacturer. Replace system when full (discharge into bag/pouch is significantly reduced).
- B. Silt may be used as general site fill or hauled off site. Remove straw bales, fabric, and prefabricated bags/pouches off site. Regrade area and return to lawn as specified.

3.11 TEMPORARY CONCRETE WASHOUT FACILITY

- A. Install per detail in a location as approved by the Owner. Provide a stable surface, easily accessible by concrete trucks.
- B. A sign shall be installed adjacent to each washout facility to inform concrete equipment operations to utilize the proper facilities. The sign shall be installed as detailed and maintained throughout the project.
- C. Temporary concrete washout facility shall be constructed and maintained in sufficient quantity and size to contain all liquids and concrete waste generated by washout operations for the entire project and by all Contracts.
- D. Perform washout of concrete mixers, delivery trucks, and other delivery systems in designated areas only.
- E. Wash concrete only from mixer chutes into approved concrete washout facility.
- F. Plastic lining material shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material. Liner seams shall be installed in accordance with manufacturers' recommendations.
- G. Contents of the concrete washout facility shall not exceed 50% capacity of the facility. At or before 50% capacity is reached, discontinue pouring concrete until the facility is cleaned out. Remove hardened concrete and properly dispose off site. Allow slurry to evaporate or remove from site and dispose off site. Immediately replace the liner if it gets damaged.
- H. Remove concrete washout facility when it is no longer needed as directed by the Architect.

3.12 TEMPORARY SEEDING AND MULCHING

- A. Provide temporary seeding of topsoil stockpile immediately.

- B. When necessary and as directed by the Architect, provide temporary seeding and mulching on disturbed areas at no additional cost to the Owner.

3.13 PERMANENT SEEDING AND SODDING

- A. Install as described in Section 32 92 01.

3.14 STRAW MAT

- A. Install as recommended by the manufacturer and as directed by the Architect for drainage channels and slopes.
- B. Stake spacing shall reflect slope to which the straw is being applied.

3.15 SPILL RESPONSE EQUIPMENT

Use per manufacturer's recommendations and as directed by the NYSDEC, or other governing agencies.

3.16 CLEAN UP

- A. During the contract and at intervals as directed by the Architect and as erosion, sediment and pollution control procedures are completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well draining, and neat condition.
- B. Clean storm ponding areas, catch basins and detention basins: Clean out contaminants, sediment, rubbish, construction debris, foreign objects and accumulated floatables from chambers and ponding areas thoroughly, immediately prior to final acceptance.

END OF SECTION

SECTION 32 12 01

ASPHALT PAVING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of asphalt paving is shown on the drawings.
- B. Asphalt Paving work includes, but is not limited to, the following:
 - 1. Soil Stabilization Fabric
 - 2. Granular Base Course
 - 3. Asphaltic Concrete
 - 4. Bituminous Tack Coat
 - 5. Painted Lines and Traffic Markings
 - 6. Hot Pour Crack Sealing and Filling
 - 7. Field Quality Control
 - 8. Asphalt Price Adjustment
 - 9. Clean up
- C. Provide all materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 22 01 - Site Earthwork
- B. Section 33 40 01 - Storm Drainage

1.03 REFERENCES

- A. The latest editions of the following Standards, as referenced herein, shall be applicable:
 - 1. New York State Department of Transportation Standard Specifications, Section 402 - "Hot Mix Asphalt (HMA) Pavements" and 407 - "Bituminous Tack Coat"
 - 2. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
 - 3. American Sports Builders Association (ASBA) Asphalt Guidelines, latest edition
- B. The following reference standards shall apply for Testing and Inspection:
 - 1. ASTM D1074: Standard Test Method for Compressive Strength of Bituminous Mixtures
 - 2. ASTM D1188: Standard Test Method for Bulk Specific Gravity and Density of Compacted Mixtures Using Paraffin-Coated Specimens.
 - 3. ASTM D2041: Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
 - 4. ASTM D2726: Standard Test Method for Bulk Specific Gravity and Density of Non-absorptive Compacted Bituminous Mixtures
 - 5. ASTM D2950: Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
 - 6. ASTM D3203: Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures

7. ASTM D3549: Standard Test Methods for Thickness or Height of Compacted Bituminous Paving Mixture Specimens
 8. NYSDOT Materials Method 28 Friction Aggregate Control and Test Procedures
- C. The following reference standards shall apply for pavement markings:
1. ASTM D562, D711, D1475, D1640, D2369, D3723, D3960.
 2. DOT Code of Federal Regulations, Hazardous Materials and Regulations Board, Reference 49CFR, ICC Regulations
 3. Federal Specification TT-P-115E, Type III (Type I if V.O.C. compliance)
- D. Additional testing required, only if directed in writing by Architect, due to asphalt installation and material issues:
1. ASTM C295: Standard Guide for Petrographic Examination of Aggregate
 2. ASTM D1560: Standard Test Methods for Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus
 3. ASTM D4125: Standard Test Methods for Asphalt Content of Bituminous Mixtures by the Nuclear Method
 4. ASTM D5444: Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
 5. ASTM D6307: Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
 6. ASTM D6931: Standard Test Method for Indirect Tensile (IDT) Strength of Asphalt Mixtures
 7. ASTM D7312: Standard Test Method for Determining the Pavement Shear Strain and Complex Shear Modulus of Asphalt Mixtures Using the Superpave Shear Tester

1.04 SUBMITTALS

- A. Provide Paving Contractor experience requirements, as outlined in "Quality Assurance" of this specification section, for the following:
1. General Paving
 2. Pavement Striping
- B. Provide Asphalt Producer Vendor Certificate and proof of quality control monitoring as outlined in "Quality Assurance" of this specification section.
- C. Provide material certificates showing content/mechanical analysis for the following:
1. Asphaltic Concrete Mix Design with Authorization Signature:
 - a. Type/name of mix (less than 24 months old)
 - b. All aggregates gradations and quality measurements
 - c. Plot (0.45 power graph) of the final aggregate blend
 - d. Bulk (dry) specific gravity of all aggregates and final aggregate blend (Gsb) including worksheets for natural (virgin) as well as reclaimed asphalt pavement (RAP)
 - e. Grade of asphalt binder (PG) being used
 - f. Optimum percent asphalt binder (Pb)
 - g. Mix air voids at optimum (Va)
 - h. Bulk specific gravity of mix at optimum (Gmb)
 - i. Theoretical maximum specific gravity of mix at optimum
 - j. Voids in the Mineral Aggregate (VMA) and Void Filled with Asphalt (VFA)

- k. Dust to total asphalt content (AC) ratio
 - l. All design data and associated design curves
- 2. Bituminous Tack Coat
- D. Provide Manufacturer's Product Data (MPD) for the following:
 - 1. Soil Stabilization Fabric
 - 2. Painted Lines and Traffic Markings
 - 3. Hot Pour Crack Sealing and Filling
- E. Provide shop drawings for the following:
 - 1. Painted Lines and Traffic Markings: Shop drawings indicating sizes, shapes, patterns, and colors of markings, including manufacturers and types of paint.
 - 2. Owner to approve all paint colors prior to installation.
- F. Submit Asphalt Placement Work Plan, indicating: paving pass widths, paving directions, site access, and timing/coordination of any site equipment installation (posts, boxes, fencing, etc.) indicated in 3.03 of this specification section. Supply Owner with yield calculations for all asphalt paving products and materials used on the project as part of the work plan.
- G. Field Quality Control test reports as indicated in this specification section.

1.05 QUALITY ASSURANCE

- A. Paving Contractor Experience Requirements:
 - 1. General Paving: Contractor shall have the experience of at least five (5) years' experience in business. Paving superintendent has a minimum of three (3) years' experience as a paving crew operating foreman.
 - 2. Pavement Striping: Contractor shall have the experience of at least three (3) years' experience in business.
- B. Asphalt Testing and Inspection Services:
 - 1. The Owner will employ and pay for the services of an Independent Testing Agency to provide testing and inspections of asphalt pavements.
 - 2. The services and the information provided by the Testing Agency are provided for the sole benefit of the Owner. The information is provided to the Contractor for the sole purpose of being aware of what is being reported.
 - 3. The Contractor is solely responsible for assuring the work complies with the Contract Documents in all respects and may not rely on the testing agency for this or any other assurances. The Testing Agency and their representatives are not authorized to revoke, alter, relax, enlarge, or release any of the requirements of the Contract Documents, approve or accept any portion of the work, perform or excuse any duties of the Contractor, or be involved in the scheduling of any work.
 - 4. Asphalt paving materials and operations shall be tested and inspected as the work progresses. Failure by the Testing Agency to detect any defective work or

material shall not in any way prevent later rejection (when such defect is discovered) nor shall it obligate the Owner for final acceptance.

- C. Asphalt producer shall monitor production according to the procedures of NYSDOT Material Method 28 Friction Aggregate Control and Test Procedures. Asphalt producer shall be a New York State approved/certified HMA (Hot Mix Asphalt) manufacturing facility.
- D. Calibrated equipment and qualified personnel must be always accessible during the construction of the HMA.

1.06 JOB CONDITIONS

- A. Job conditions in Section 31 22 01 apply.
- B. Atmospheric conditions for applying courses:
 - 1. Hot mix asphalt shall generally arrive on the project site between 270°-300° F. (per asphalt producer recommendations).
 - 2. Place asphalt concrete wearing course or bituminous surface treatment only when atmospheric temperature is above 50 degrees F. and rising, and when asphalt binder course is thoroughly dry.
 - 3. Place binder course only when air temperature is above 45 degrees F. and rising and when asphalt base course or granular stone base course is thoroughly dry.
- C. Grade Control: Establish and maintain required lines and elevations.
- D. Codes and Standards: Perform the work in compliance with applicable requirements of governing authorities having jurisdiction. Obtain and pay for permits required by local authorities.
- E. Construction Review and Testing: Notify and coordinate with the Independent Testing Agency and Architect when the subgrade is shaped and ready for proof rolling. Also, when the granular base course is fully installed, compacted and ready for density testing. Protect subgrade and subbase at all times.
- F. When staging or scheduling delays occur and wearing course cannot be installed directly after binder course installation before winter, provide temporary asphalt transition ramp/collar around drainage structures in paved areas and at handicap ramps to prevent damage by snow plow. Remove prior to installation of wearing course. Power wash surface and apply asphalt tack coat, as specified, prior to wearing course installation, at no additional cost to the Owner.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver all materials to the job site with all labels intact and legible at time of installation.
- B. Store materials off ground under cover. Protect from damage or deterioration.
- C. Handle materials to prevent damage to surface, edges, ends and factory applied finishes of items. Damaged material shall be rejected and replaced.

1.08 ASPHALT PRICE ADJUSTMENT

- A. Asphalt pricing is based on the NYS Department of Transportation average posted prices for Asphalt Performance Graded Binder (PGB). NYSDOT Website:
<https://www.dot.ny.gov/main/business-center/contractors/construction-division/fuel-asphalt-steel-price-adjustments>
- B. Asphalt Price Adjustment: The asphalt price adjustment will be based solely on the price changes for asphalt as determined by the formulas below. No adjustment will be made if the monthly average posted price is within \$15.00 of the asphalt index price. No consideration will be given to the situation where an individual supplier's price exceeds the monthly average posted price.
- C. Prices: The Asphalt Index Price and Monthly Average Posted Price are defined as follows:
1. Asphalt Index Price: The asphalt index price is a price per ton of Performance Graded Binder (PGB) used solely as a basis from which to compute asphalt price adjustments. The asphalt index price for original contract bid price items and additional work at the original contract bid price will be the monthly average posted price for the month of the bid letting.
 2. Monthly Average Posted Price: The average terminal price for unmodified PG 64-22 binder, without anti-stripping agent, determined by the NYSDOT, based on prices of approved primary sources of PGB.
- D. Adjustment: Asphalt price adjustment will be based on the following formulas:
1. When price Increases: Price Adjustment = (tons x % asphalt) x (Monthly Average Posted Price – PGB Index Price - \$15.00)
 2. When price Decreases: Price Adjustment = (tons x % asphalt) x (Monthly Average Posted Price – PGB Index Price + \$15.00)
- E. Pavement Types and Percent Asphalt*:
- | | |
|-----------------------------|--------------|
| 37.5mm Type 1 Base Course | 4.8% Asphalt |
| 19.0mm Type 3 Binder Course | 4.8% Asphalt |
| 12.5mm Type 6 Top Course | 5.9% Asphalt |
| 9.5mm Type 7 Top Course | 6.3% Asphalt |
- * Percentage of Asphalt is approximate and shall be based off actual project submittals provided by the Asphalt Producer.
- F. Asphalt Price Index shall be based on the month of the bid date.

PART 2 - PRODUCTS

2.01 SOIL STABILIZATION FABRIC

- A. Shall be a heavy duty, commercially manufactured woven polypropylene geotextile. Standard of quality shall be Mirafi 500X, manufactured by TenCate or Architect approved equal.

2.02 GRANULAR BASE COURSE

- A. Shall be as specified in Section 31 22 01.

- B. The graded and designed granular base below all new Asphaltic Concrete Pavements shall be constructed, tested, and prepared in accordance with Section 31 22 01 - Site Earthwork of the Contract Documents.

2.03 ASPHALTIC CONCRETE

A.	<u>Pavement Types</u>	<u>Percent Asphalt*</u>
	19.0mm Type 3 Binder Course	4.8% Asphalt
	9.5mm Type 7 Top Course	6.3% Asphalt

* Percentage of Asphalt is approximate and shall be based off actual project submittals provided by the Asphalt Producer.

- B. Hot Mix Asphalt Top Course: Pavement shall meet the minimum requirements for 9.5 mm (Type 7) SUPERPAVE Hot Mix Asphalt Top Course (75 gyrations), with a PG 64-22 Binder as specified in Section 402, of the current NYSDOT Standard Specifications, with the exception that the maximum proportion of Recycled Asphalt Pavement (RAP) to virgin aggregates shall not exceed 15% of the total mix.
- C. Hot Mix Asphalt Binder Course: Pavement shall meet the minimum requirements of 19.0mm SUPERPAVE Hot Mix Asphalt Binder Course (75 gyrations), with a PG 64-22 Binder, as specified in Section 402, of the current NYSDOT Standard Specifications, with the exception that the maximum proportion of Recycled Asphalt Pavement (RAP) to virgin aggregates shall not exceed 20% of the total mix.
- D. The coarse aggregate used in HMA shall be sound, angular crushed stone or crushed gravel. The fine aggregate shall be well graded, moderately sharp to sharp (angular) sands.

2.04 BITUMINOUS TACK COAT

- A. Material shall consist of an asphalt emulsion, Grade RS-1h, and shall meet the minimum requirements of Section 407, of the current NYSDOT Standard Specifications. Bituminous Tack Coat shall be installed over all new and existing concrete and asphalt pavements and structures prior to the installation of new Hot Mix Asphalt materials. The following application rates shall apply:
- | | | |
|----|--|------------------|
| 1. | New Hot Mix Asphalt | 0.05-0.07 gal/sy |
| 2. | Milled Surfaces of Existing Asphalt | 0.10-0.15 gal/sy |
| 3. | Abutting Vertical Edges (drainage structures, appurtenances) | 0.05-0.07 gal/sy |
| 4. | All Styles of Curbs and Gutters | 0.05-0.07 gal/sy |
| 5. | Delayed asphalt installation of HMA Courses | 0.10-0.15 gal/sy |

2.05 PAINTED LINES AND TRAFFIC MARKINGS

- A. The extent of the pavement markings shall match the extent, location and composition of pavement markings existing at the site prior to start of work where applicable.
- B. The work includes, but is not limited to the following: parking stall divider lines, wheelchair legends, "STOP" legends, "NO PARKING" legends, pick-up zone, striping and legends, directional arrow legends, diagonal striping, center line striping, fire lane striping, student area line striping, and other pavement markings as may be shown on the plans.

- C. Provide ready-mixed, one component waterborne traffic line paint. The standard of quality shall be: Pro-Park® Waterborne Traffic Marking Paint B-97 Series as distributed through Sherwin-Williams, 800-474-3794; or Architect approved equal.
1. Colors (as approved by the Owner in writing):
 - a. Yellow: 1 Gallon & 5 Gallon, Product Number B97YD2467
 - b. White: 1 Gallon & 5 Gallon, Product Number B97WD2434
 - c. Blue: 1 Gallon & 5 Gallon, Product Number B97LD2022
 - d. Black: 1 Gallon & 5 Gallon, Product Number B97BD2021
 2. Paints shall contain all necessary co-solvents, dispersants, wetting agents, preservatives and all other additives, so that paint shall retain viscosity. Halogenated solvents and glass beads shall not be permitted.
 3. Volatile Organic Compound (VOC) content shall not exceed 250 grams maximum per liter of paint as determined in accordance with ASTM D 3960 test, excluding water and exempt solvents.

2.06 HOT POUR CRACK SEALING AND FILLING

- A. Single component, hot applied asphalt crack and joint sealant capable of withstanding temperatures of up to 450° without experiencing polymer degradation.
- B. Shall be supplied in solid blocks comprised of heat stabilized polymers and asphalt.
- C. Meeting the following material requirements when tested in accordance with ASTM D5329. (see chart below)

Chemical & Physical Analysis

Recommended Application Temperature	350-400°F
Maximum Heating Temperature	450°F
Cone Penetration at 25°C	50 max.
Flow at 60°C, mm	0.
Softening point	200°F Min.
Flexibility 0°F	(1" Mandrel)-Pass
Specific Gravity	1.17
Asphalt Compatibility	Passes

- D. Standard or quality shall be Crack Master Supreme as manufactured by Thorworks Industries, Inc., 800-395-7325, www.thorworks.com or approved equal.

PART 3 - EXECUTION

3.01 PREPARE SURFACE

- A. Prior to commencement of asphalt paving, all excavations, drainage, utilities, backfilling, fencing, bollards, storm structures, curbing installations, adjustments, proof-rolling and density test procedures shall be complete to the satisfaction of the Architect.
- B. Prior to commencement of tack coat and asphalt paving within pavement milled areas, as shown on the plans, all cracks and joints in the milled pavement surface shall be prepared and filled in accordance with the project specifications. Any oil or grease spots shall be scraped and treated to prevent bleeding through the tack coat.

- C. Saw cut, using straight and true lines, all existing asphalt pavements to remain in place with straight, neat edge for abutting against proposed asphalt pavement.
- D. Provide and confirm field quality control as described in Section 31 22 01 for pavement subgrade and granular base course stone.

3.02 CONSTRUCT PAVEMENT GRANULAR BASE COURSE

- A. General: Consists of placing granular base course material, in layers of specified thickness, over prepared subgrade and fabric to support a pavement course.
- B. Grade Control: Provide engineering layout per Section 31 22 01 and grade stakes. During construction, protect grade stakes; maintain lines and grades including crown and cross-slope of each course.
- C. Install soil stabilization fabric after subgrade has been acceptably compacted and proof rolled. Install soil stabilization fabric as recommended by the manufacturer AND;
 - 1. Lay fabric in the direction of construction traffic.
 - 2. Overlap fabric side to side and end to end a minimum of two (2') feet.
 - 3. Establish reasonable compaction and rut stability before using heavy or vibratory compaction equipment.
- D. Placing:
 - 1. Place granular base material over soil stabilization fabric, on prepared subgrade in layers of uniform thickness, conforming to the asphalt pavement details on the drawings.
 - 2. Place granular base material in a maximum of six (6) inch layers and compact with a vibratory or 10-ton smooth wheeled roller.
- E. Provide density testing as described in Section 31 22 01.
- F. Surface Smoothness: Test finished surface for smoothness. Surface will not be acceptable when it deviates more than 3/8" measured by a 10-foot straightedge, in any direction.
- G. The finished grade of the granular base course shall be verified to ensure that the final finished product of the bituminous concrete pavement surface will be installed to the lines and grades of the existing pavements and proposed elevations surveyed by the Contractor prior to the start of the paving work.

3.03 PLACE ASPHALT MIX

- A. General:
 - 1. The Contractor shall submit a paving plan, indicating intended direction of paving, number of pulls, etc. for approval prior to the start of paving operations.
 - 2. Joints: Saw cut vertical straight, neat edges for joints required. Joints shall be sharp and clean, conforming to shapes drawn on drawings. Ragged joints will not be accepted.

3. Mill two (2') feet into the surface of adjacent asphalt so joints do not line up or "stack".
 4. Place bituminous tack coat to all surfaces as indicated in this specification. When pavement surface temperature is above or below the 75-130 degrees F. range, the grade of asphalt emulsion must be modified according to NYSDOT standards. Tack coat shall not be applied to a wet surface or when the pavement surface temperature is below 45 degrees F.
 5. Place asphalt on approved prepared surface, spread and strike-off.
 6. Spread mixture at minimum temperature of 225-240 degrees F. Place inaccessible and small areas by hand. Hand work shall be minimized to ensure the best possible finished surface.
 7. Place each course to required grade, cross-section, and compacted thickness.
 8. Paving operations shall not be scheduled when ample time does not exist to place, compact, and finish roll the hot mix asphalt during daylight hours and prior to rainfall.
- B. Pavement Placing: Shall be installed in accordance with Section 402-"Hot Mix Asphalt (HMA) Pavements", of the current NYSDOT Standard Specifications.
- C. Paving Equipment:
1. Must be capable of placing, spreading and finishing courses of HMA to the specified thickness.
 2. HMA shall be free of marks, segregation and be placed to the required uniform elevation with a smooth texture not showing tearing, shoving, or gouging.
 3. Auger extensions are required while pavers are extended beyond the basic screed width.
 4. Paving equipment shall be self-propelled and capable of maintaining the line and grade shown on the plans with suitable electronic equipment. The screed shall be straight and true with no bow and utilizing a vibratory screed. Paving equipment should have fully functional screed heaters and joint preheaters.
- D. Asphaltic Concrete shall be installed as follows:
1. Medium Duty Asphalt Pavement: Installed in two (2) lifts consisting of 19.0mm SUPERPAVE Hot Mix Asphalt Binder Course overlain by 9.5mm SUPERPAVE Hot Mix Asphalt Top Course.
- E. Place in strips not less than ten (10') feet wide, unless otherwise acceptable. In placing each succeeding pass after the placement of the initial pass, the screed of the paver shall be set such that it overlaps the preceding pass by 6" and be sufficiently high such that when compacted, a smooth joint is produced. Prior to pinching the joint, the excess material shall be pushed onto the edge of the new pass with a lute. Excess material shall be removed.
- F. After the first lift has been placed and rolled, place succeeding lifts and extend rolling to overlap previous lifts. Where possible, the top course shall be placed at right angles to

binder course and in the direction that the drainage flows. Where this is impractical, offset joints of the two courses by a minimum of two (2') feet so upper and lower joints do not align.

- G. For pavement placing for roadways: the paver shall be equipped with and utilize both automatic (laser controlled) grade and slope control to maintain required tolerances and profiles show on the plans.

3.04 ROLL ASPHALT MIX

A. General:

1. Rollers shall conform to the manufacturer's specifications for all ballasting. At least one vibratory roller shall be required for each project, with two rollers required as a minimum. (Three rollers shall be required when tonnage is greater than 300 tons/day.)
2. Rollers shall be in a good condition and capable of compacting the HMA to the minimum in-place density required by this specification. Compact asphalt with a nominal 10-ton steel wheel roller or pneumatic rubber-tired roller. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
3. Begin rolling when mixture will bear roller weight without obvious or excessive displacement.

- B. Finish Rolling: Each lift of the Asphaltic Concrete Pavement shall be mechanically rolled and compacted to the finished thicknesses specified in the Contract Documents. The pavements shall be compacted to a minimum of 94%-97% (95%-102% at longitudinal joints) of the materials theoretical density as determined by AASHTO Method T 209 and an air void percentage of 5%-6% maximum.

- C. Patching: Remove and replace paving areas mixed with foreign materials, dirt, and defective areas. Cut-out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.

D. Joints:

1. The Contractor shall sequence the installation and orientation of all Asphaltic Concrete Pavements such that the minimum numbers of longitudinal and transverse joints are produced and in accordance with the approved Asphalt Placement Work Plan.
2. Neat, straight butt joints between successive passes. Offset joints a minimum of six (6") inches between lifts of asphalt.
3. When repairs or staging of work occurs, make neat vertical saw cut between old and new work to create butt joint. Heat joint prior to pouring. Cold joints are not acceptable.
4. Apply bituminous tack coat to all surfaces and rates indicated under "Bituminous Tack Coat" of this specification section. Tack coat shall not be required on abutting vertical edges for pavements placed in the same day.
5. Minimize construction, longitudinal, and transverse joints left open for an extended period of time.

6. Construct longitudinal joints by paving in a hot fashion with a temperature of not less than 220°F to ensure maximum performance and adhesion.
 7. Compact all joints to provide for a neat, uniform and tightly bonded joint that will meet both surface tolerances and density requirements of this specification.
 8. Cut straight and true (vertical construction or transverse joints if the material has cooled to less than 220°F prior to the placement of the next pass to ensure the best performing joint possible.
- F. Edges: Roll at 45 degrees as detailed, creating clean edge conforming to shapes indicated on the drawings. Ragged edges will not be accepted. Return and saw cut ragged edges at no additional cost to the Owner as directed by the Architect.
- G. The final finished grades of the new Bituminous Concrete Pavements must be smooth and true to the contours and shall be installed to the lines and grades of the site prior to start of construction. The final finished grades shall match adjacent pavement surfaces and concrete slabs, aprons, and doorways.
- H. Construction Delays (over 48 hours): When placement of the wearing course over the binder course is delayed over 48 hours, thoroughly clean existing surface of dirt, oil and other debris by pressure washing and sweeping. Place bituminous tack coat as specified in this section.

3.05 ASPHALT TOLERANCES

- A. Thickness and Density: Compact each asphalt course to produce the thickness indicated on the drawings within the following tolerances:
1. Binder Course: Plus or minus 1/4-inch
 2. Wearing Course: Plus or minus 1/8-inch
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined using a 10-foot straightedge applied transversely or longitudinally to paved areas:
1. For Asphalt Concrete:

Binder Course Surface:	1/4"
Wearing Course Surface:	1/8"
- C. Asphalt Cores: Shall be provided as indicated under "Field Quality Control" of this specification.

3.06 FIELD QUALITY CONTROL

- A. The Owner's Testing Agency shall provide the following in the daily report at a minimum:
1. Verify the following for the asphalt mix design prior to asphalt placement:
 - a. The asphalt mix design has been approved.
 - b. The asphalt mix design specifies the minimum relative compaction and the methods required to determine maximum density.

2. Verify the asphalt subgrade has been acceptably proof rolled. (See Section 31 22 01.)
3. Inspect /test aggregate base course material for in-place density (95%) and thickness. Test materials for gradation classification, and physical properties. (See Section 31 22 01.)
4. Inspect/test asphalt wearing course material for compaction during placement and conduct thickness measurements during lay-down. Take temperature of the asphalt mixture and compare actual temperature with the approved asphalt mixture design range. As a minimum, perform the following inspection/tests:
 - a. Collect trip tickets from trucks delivered to the site and verify the correct mix design being used for the project.
 - b. Temperature tests: one per truck.
 - c. Lay down thickness (uncompacted): one per strip or 500 square feet minimum.
 - d. Verify equipment rolling pattern and passes to ensure proper compaction: one per day.
 - e. Density test (daily lab density): one test per 5000 square feet minimum
 - f. Hot mix samples (laboratory testing for density per ASTM D1188): one per day.
 - g. Thickness per ASTM D3549 and density samples per ASTM D2950 by a properly calibrated nuclear asphalt testing device. If there is a disagreement between tests done by ASTM D2950 and ASTM D1188, the values done by ASTM D1188 will govern: one test per 20,000 square feet (surface lift), one test per 10,000 square feet (base lift)
 - h. Air voids per ASTM D3203 or D2726: one test per 5000 square feet minimum
 - i. Verify compaction at the joints and seams. The completed paved surface to be true to grade and cross section. Verify smoothness by using an unleveled 10-foot straightedge and ensuring no gap at any point between straightedge and pavement exceeds surface smoothness requirements above except at interception or at changes of grade.
 - j. The screed/lay down thickness tolerance shall be between 1/8 to 3/16 inches greater than the required asphalt minimum layer requirement. When screed depth is set for the exact thickness as specified, immediately notify the Owner's Representative and Contractor that the installed asphalt thickness may be deficient to achieve the specified minimum thickness. Identify areas of non-complying thickness and attach a drawing identifying the areas to the daily field report.
 - k. Immediately notify the Owner's Representative and Contractor when paving is being conducted in cold weather and asphalt temperatures are below or above the design mix range.
 - l. Check the surface grades and drainage patterns. Identify on a drawing all paved areas that are holding water after asphalt placement and notify the Owner's Representative and Contractor. Small ponding areas (bird baths) larger than two (2') feet in any dimension are not acceptable. When this test proves that surface conditions are not acceptable, the Contractor will be responsible for correcting the problem areas. Install a one (1") inch shim coat for wearing course material, or other means acceptable to the Architect.
 - m. Verify tack coat and edge coat have been applied at the proper rate.
5. Asphalt Cores: Shall be as directed by the Architect.

- a. Prior to final acceptance of the asphalt and before lining or other surface materials (resilient track surfacing, etc.) are placed, the Owner's Testing Agency shall core 3" diameter areas of the asphalt surfacing where directed by the Architect. Consistency, density, thickness, and tensile strength per ASTM D6931 will be evaluated.
 - b. Patch core areas as directed by the Architect to match adjacent density, texture and thickness.
 - c. Coordinate day-to-day scheduling with the Testing Agency.
 - d. If cores vary significantly from the contract requirements, additional cores will be performed by the Testing Agency as directed by the Architect. Once the overall general quality is determined, provide remedial work as directed by the Architect to achieve the quality and consistency as specified.
- B. Unacceptable Paving: Remove and replace unacceptable paving as directed by the Architect, immediately and without argument or delay. Correction of deficient areas in the wearing course shall be done by sawcutting and removal of defective areas of work. Tack coat shall be applied to all edges and the pavement shall be replaced. Shimming or skin patching of the wearing . rse shall not be permitted. Correction of deficient areas within the binder course shall be corrected by sawcutting and milling high spots, and truing and leveling low spots or as directed by the Architect.

3.07 SURFACE PROTECTION

- A. Protection: After final rolling and sealing, do not permit any type of vehicular or construction traffic on pavement until it has cooled and hardened as recommended by the producer/manufacturer, minimum of 48 hours.
- B. Provide protection including, but not limited to, fencing, traffic cones, barrels, lights, reflective signs, flag persons and barricades until mixture has cooled and attained its maximum degree of hardness.

3.08 PAINTED LINES AND TRAFFIC MARKINGS

- A. Cleaning: Sweep and clean the surface to eliminate loose material and dust. Remove dirt, oils and other foreign matter. All surfaces to receive pavement markings shall be clean and in good condition to accept pavement markings.
- B. Coordinate provisions for installation with work of other trades.
- C. Locate to alignment and dimensions as shown on drawings and/or approved by Owner.
- D. Painted markings shall meet regulations described in the "Manual of Uniform Traffic Control Devices", latest edition, as published by NYSDOT, Division of Traffic and Safety, Section 262.25 and figure PM-42; and they shall comply with the most recent version of the Americans with Disabilities Act Standards for Accessible Design.
- E. Protect: Adjacent surfaces and other items to remain with tape, drop cloths, or other Architect approved means.
- F. Application: Two coats according to manufacturer's recommendations resulting in a dense, opaque application without any ghosting of former pavement markings showing through. Overspraying along edges will not be accepted. Edges shall be sharp and crisp, to the shapes required by the drawings.

1. The first coat shall be installed at the recommended DFT (dry film thickness) after paving is in place. The second coat shall be applied to the recommended DFT no later than thirty (30) days after the completion of work.
2. Apply paint materials using clean brushes, rollers or spraying equipment.
3. Apply paint materials as a rate not exceeding those recommended by the paint manufacturer for surfaces being painted, less 10% of losses.
4. Comply with manufacturer's recommendations for drying time between coats. The minimum DFT must be met. Apply additional coats as needed to achieve the minimum total specified DFT of the paint system.
5. The minimum required total Dry Film Thickness (DFT): The DFT shall be the minimum required thickness as measured in mils.
6. System coverage requirements minimum total thickness (unless otherwise noted):
 - a. 1st Coat – 3.0 mils
 - b. 2nd Coat – 6.0 mils
7. Exterior Paint Systems: Provide the following paint systems as indicated: (Colors to be approved by Owner.)
 - a. Parking stall, division and limit lines shall be 4" in width, true and straight. Color: White – DFT 6.0 mils
 - b. Pavement lettering "NO PARKING" shall be 2'-0" in height. Color: Yellow – DFT 6.0 mils
 - c. Compact lettering "COMPACT" shall be 1'-0" in height. Color White – DFT 6.0 mils
 - d. Stop legends shall be as detailed on drawings. Color: White – DFT 6.0 mils
 - e. Wheelchair legends shall be as detailed on the drawings. Color: Blue background with white symbols. Parking stall striping shall be Blue at handicap stalls only – DFT 6.0 mils
 - f. Diagonal striping Handicapped. Color: Blue – DFT 6.0 mils
 - g. Diagonal striping Loading Zone. Color: Yellow – DFT 6.0 mils
 - h. Directional signage shall be as detailed on the drawings. Color: White – DFT 6.0 mils
 - i. Center line striping shall be 4" in width as detailed on the drawings. Color: White – DFT 6.0 mils
 - j. Fire line striping shall be 4" in width. Color: Yellow – DFT 6.0 mils
- G. Allow 48 hours minimum curing time for paint before allowing traffic on surfaces. Clean up thoroughly including all protective tape, spilled paint, and debris. All parking areas marking and painting to be protected by appropriate traffic barriers, lighted if necessary, so located as to prohibit parking and traffic until traffic lines are completed and properly dry.

3.09 HOT POUR CRACK SEALING AND FILLING

- A. The crack must be free from moisture, dust, and loose aggregate. Routing or wire brushing are preferred methods followed by a compressed air heat lance immediately prior to sealing. The substrate and air temperature must be above 45°F.

- B. Shall be melted in direct fired or oil jacketed melters. Material should reach the recommended pouring temperature of 350-400°F. Fresh material may be added as sealant is used.
- C. Apply heated crack filler using either a pump and wand system or a pour pot. For best results the sealant depth to width ratio should not exceed 2 to 1 (i.e. 2-inches deep to 1-inch wide). The cooled sealant height should not exceed 1/8" above surrounding pavement. Using a sealing shoe or squeegee, band the material 2 to 3 inches wide over the crack.

3.10 CLEAN UP

During the contract, and at intervals as directed by the Architect, and as asphalt paving is completed, clear the site of extraneous fabric, gravel, asphalt and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION

SECTION 32 13 01

SITE CONCRETE WORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of site concrete work is shown on the drawings and includes formwork, reinforcement, accessories, cast in place concrete, installation of embedded items, finishing, curing, mix designs, testing and acceptance requirements for concrete.
- B. Site Concrete work includes, but is not limited to, the following:
 - 1. Concrete walks and pads
 - 2. Concrete curb (cast in place or slip-form)
 - 3. Concrete footings, bases, foundations
 - 4. Concrete scheduling April 1 to October 15
 - 5. Clean up
- C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 22 01 - Site Earthwork
- B. Section 32 30 00 Series - Site Improvements

1.03 REFERENCES

- A. ACI 301-96 - Specifications of Structural Concrete for Buildings
- B. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement
- C. ASTM C31 - Standard Practice for Making and Curing Test Specimens in the Field
- D. ASTM C33 - Concrete Aggregate
- E. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- F. ASTM C94 - Ready-Mixed Concrete
- G. ASTM C109 - Test Method for Compressive Strength of Hydraulic Cement Mortars
- H. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
- I. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)
- J. ASTM C150 - Portland Cement
- K. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete

- L. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method
- M. ASTM C260 - Air Entraining Admixtures for Concrete
- N. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete
- O. ACI 315 - Details and Detailing Concrete Reinforcement

1.04 SUBMITTALS: (See Section 31 12 01, 1.05)

- A. Manufacturers Product Data (MPD) and Samples where indicated are required for the following:
 - 1. Expansion Joint and Sealant (Vertical and Horizontal): MPD and Color Samples
 - 2. Water Based Curing and Sealing Compound
 - 3. Slip Dowel System
 - 4. Cold Weather Admixture
 - 5. Hot Weather Admixture
 - 6. Air Entrainment
 - 7. Curb Ramp Detectable Warning System
 - 8. Form Release
- B. Submit proposed 4,000 psi concrete mix design and test data in accordance with ACI 301 to the Architect for review prior to commencement of the work.
 - 1. Indicate the locations and elements for which the mix will be used.
 - 2. Include in the concrete mix design all required or proposed admixtures necessary to facilitate the installation of the concrete by the means and methods selected by Contractor for this project.
- C. Mill test certificates and/or test reports for cement indicating compliance with these specifications.

1.05 QUALITY ASSURANCE

- A. Concrete Testing Services: The Owner shall employ an acceptable independent testing laboratory to perform materials evaluation, testing of concrete mixes, and quality control testing. Coordinate day to day scheduling with the testing agency. Field technician shall be ACI Certified Grade 1 Field Technician.
- B. Construct and erect concrete formwork in accordance with ACI 301 and 347.
- C. Perform concrete reinforcing work in accordance with ACI 301.
- D. Perform cast-in-place concrete work in accordance with ACI 301.
- E. Conform to New York State Building Code.
- F. Field quality control tests are specified in Part 3 - Execution.

1.06 JOB CONDITIONS

- A. Job conditions in Section 31 22 01 apply. Provide ample and skilled manpower for concrete installation which is a recognized time sensitive procedure.
- B. All concrete work shall conform to American Concrete Institute (ACI) 304R-00 "Guide for Measuring, Mixing, Transporting and Placing Concrete".
- C. Do not install concrete work when the temperature of the outside air is below 50 degrees F. and falling unless suitable means acceptable to the Architect are provided to protect work from cold and frost and ensure that mortar and concrete will cure without freezing as indicated in "Cold Weather Concreting" below.
- D. Cold Weather Concreting: Provide non-chloride accelerating water reducing admixture in site concrete work placed at ambient air temperatures below 50 degrees F. (10 degrees C.). Comply with International Masonry Industry All-Weather Council cold weather construction and protecting recommendations and American Concrete Institute 306R-10 "Guide to Cold Weather Concreting."
- E. Hot Weather: Provide water reducing retarding admixture in site concrete work placed at ambient air temperatures above 80° F. Comply with American Concrete Institute 305R-10 "Guide to Hot Weather Concreting."
- F. Construction Review: Notify the Architect/Geotechnical Engineer when stairs, retaining walls, walks, ramps, curbs and pads are formed and ready to receive concrete. Radius form layout shall be inspected and approved by the Architect.
- G. Schedule: Unless otherwise directed in writing by the Architect, construct site concrete work from April 1 to October 15. This permits a minimum 30 day dry curing period prior to possible application of deicing chemicals by the Owner.
- H. Site concrete work performed between October 16 and March 30 will require an additional written one (1) year guarantee with the understanding that above average concrete deterioration and replacement by the Contractor is likely. Or;

Provide temporary light duty asphalt access paths and replace with permanent concrete during the following April 1 to October 15 timeframe. Both options are at no additional cost to the Owner.

1.07 ADA REQUIREMENTS

- A. GENERAL: Concrete work shall comply with the Americans With Disabilities Act as described in the 2010 ADA Standards issued by the Department of Justice (DOJ) and the Department of Transportation (DOT) or latest edition, shall be used.
- B. Concrete walk surfaces shall meet the following tolerances:
 - 1. Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes.
 - 2. Thresholds at doorways shall not exceed 3/4" in height for exterior sliding doors or 1/2" for other types of doors. Raised thresholds and floor level changes at accessible doorways shall be beveled with a slope no greater than 1:2.
 - 3. Detectable warning system shall cast in place for the safety and convenience of the visually impaired. Contractor shall have a minimum of three (3) years experience with materials and installation.

PART 2 - PRODUCTS

2.01 FORM MATERIALS AND ACCESSORIES

- A. Forms: Either steel or wood, exterior type softwood, PS1, of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use forms that are straight and free of distortion and defects, extending the full depth of concrete. Concrete walks which require radius form work shall be set with flexible forms, conforming to the shapes and dimensions as indicated.
- B. Lumber: PS 20.
- C. Form Release Agent: Shall be non-staining and non-residual. Increte Wall Form Release manufactured by Increte or Architect approved equal.

2.02 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, plain finish, free of rust and/or oxidation. Reinforcing bars shall be bundled and tagged with grades and suitable identification markings, shall be waterproof, and shall not be removed until steel is placed.
- B. Steel Welded Wire Reinforcement ASTM A185, plain type:
 - 1. Flat Sheets
 - 2. Mesh size: 6 x 6 (standard W1.4 x W1.4, heavy duty W2.1 x W2.1)
 - 3. Free of rust and/or oxidation
- C. Reinforcement Accessories:
 - 1. Tie Wire: FS QQ- W-461 G, annealed steel, back, 16-gage minimum.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. They shall provide sufficient supports at close enough spacing so that the steel will carry the weight of the workmen and the fresh concrete without deformation from its specified location.
- D. Fabricate concrete reinforcing in accordance with ACI 315.
- E. Slip Dowels: Shall be a slip dowel system comprised of a round dowel sleeve and corresponding base. Standard of quality: shall be Speed Dowel as distributed by A.H. Harris, (860) 216-9500 or Architect approved equal.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150, Normal-Type 1 or Type II, Portland type.
- B. Aggregates (ASTM C33):
 - 1. Fine aggregates: clean, sharp, natural sand.
 - 2. Coarse Aggregates: 3/4" maximum size stone meeting the requirements of New York State Department of Transportation Specification 703.02.
- C. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

- A. Calcium Chloride in concrete is prohibited.
- B. Air Entrainment Admixture: ASTM C260, Darex AEA ED or Architect approved equal.
- C. Water Reducing Admixture: ASTM C494, Type A; not containing more chloride ions than are present in municipal drinking water.
- D. High Range Water Reducing Admixture: ASTM C494, Type F or G; not containing more chloride ions than are present in municipal drinking water.
- E. Cold Weather Accelerating Admixture: (Ambient temperature below 50°F.) Non-chloride water reducing accelerating admixture, ASTM C494, Type C, PolarSet as manufactured by WR Grace & Co. or Architect approved equal. Mix at rates recommended by the manufacturer. No reduction in compression rating of the concrete is permitted.
- F. Hot Weather Water Reducing and Retarding Admixture: (Ambient temperature above 80° F.) Shall be Daratard series admixture, ASTM C494, Type D, as manufactured by WR Grace & Co. or Architect approved equal. Mix at a rate recommended by the manufacturer. No reduction in compression rating of the concrete is permitted.

2.05 RELATED MATERIALS

- A. Expansion Joints:
 - 1. For Radius Applications: Expansion joint filler shall be polyethylene closed cell backing with peel off strip, X-Foam as manufactured by W.R. Meadows or Architect approved equal.
 - 2. For Straight Applications: Expansion joint filler shall be fiber expansion joint with peel off snap-cap, as manufactured by W.R. Meadows or Architect approved equal.
- B. Caulking for flat slabs shall be one part elastomeric self leveling polyurethane gray sealant Pourthane SL or Architect approved equal. Caulking for vertical surfaces shall be one component elastomeric gun grade polyurethane sealant Pourthane NS, color as selected by the Owner to match wall stain or Architect approved equal.

2.06 COMPOUNDS, HARDENERS, AND SEALERS

- A. Water Based, Acrylic, Curing and Sealing Compound: ASTM C309, Type 1, Class A and B, clear or translucent. Standard of quality shall be VOCOMP-20 as manufactured by W.R. Meadows or Architect approved equal.
- B. Fiber Reinforcement for slip-form Curbs: Shall be Grace Fibers ¾" long, fibrillated polypropylene fibers as manufactured by WR Grace & Co. or Architect approved equal. Add fibers to concrete at the rate of 2.0 lbs./c.y. and as recommended by the manufacturer.

2.07 CONCRETE MIX

- A. Mix and deliver ready-mix concrete in accordance with ASTM C94.
- B. Concrete:
 - 1. Compressive Strength (Minimum at 28 days): 4,000 psi
 - 2. Slump (Maximum): 2 to 4 inches
 - 3. Air Entrainment: 5-8.5%

- 4. Flexural Strength (ASTM C78): 650 psi at 28 days.
- C. Use water-reducing admixture in all concrete.
- D. Water/Cement Ratio: Maximum 0.42 for 4,000 psi concrete.
- E. Cement Factor Per Cubic yard: Minimum 560 lbs. for 4,000 psi concrete.
 - 1. Substitution of fly ash for cement is prohibited.
- F. Maximum Size of Coarse Aggregate:
 - 1. General Work: Per ACI 301, 3/4" maximum.
- G. Select admixture proportions for normal weight concrete in accordance with ACI 301.
- H. Add air-entraining agent to concrete mix for all concrete work exposed to exterior.

2.08 MIXING WATER CONTROL

- A. The quantity of mixing water used in the concrete mix shall be determined by the Contractor, except that the Architect/Geotechnical Engineer may direct that such quantity of water be reduced if the slump of the concrete exceeds the specified slump. The Contractor's determination of the quantity of mixing water shall conform to the various limits on water/cement ration and slump specified. Concrete consistency shall be uniform from batch to batch.
- B. During the course of the work, the batch plant will make quantitative measured moisture determinations of the aggregates utilized in each batch. Aggregate weights and batch water requirements shall be adjusted accordingly for measured aggregate moisture content.
- C. When concrete is transported in units approved for mixing, the addition of not more than 10% of the total design water will be permitted at the job site to obtain initial slump.
 - 1. Any addition of water shall be followed by mixing of at least 30 revolutions in the mixing speed range.
 - 2. No more than two additions of water at the point of deposition before discharge shall be allowed.
 - 3. No retempering of the concrete will be permitted. Retempering is defined as the addition of water after the mix has attained its desired initial slump.

2.09 DETECTABLE WARNING SYSTEM

- A. Cast in place vitrified polymer composite (VPC) detectable/tactile warning tiles shall be an epoxy polymer composition with aluminum oxide particles in the truncated domes. Standard of quality shall be Armor-Tile 24" x 60" cast-in-Place Inline Dome Tactile Tile (ADA-C-2448) as manufactured by Engineered Plastics, Inc. 800-682-2525 or Architect approved equal.
- B. Color shall be colonial red (Federal No. 20109) or Architect approved equal.
- C. Guarantee period shall be five (5) years from substantial completion including defective work, breakage, deformation, heave, and loosening tiles.

PART 3 - EXECUTION

3.01 CONCRETE WALKS AND PADS

- A. Surface Preparation: Remove loose material from the compacted subgrade surface immediately before placing concrete. Remove any standing water, mud, debris, frost, snow, ice from surfaces upon or against which concrete is to be placed.
- B. Proof-roll prepared subgrade surface to check for unstable areas and the need for additional compaction. Do not begin concrete pour until such conditions have been corrected, subgrade is compacted to 95% and ready to receive concrete.
- C. Form Construction: Construct to required size and shape. Brace and secure to maintain alignment, elevation and position. Check completed formwork for grade and alignment, prior to installing concrete. Clean forms as needed to removed foreign matter.
- D. Install welded wire mesh on concrete brick or mesh chairs to proper level in maximum lengths possible. Offset end laps in both directions. Splice laps with tie wire. Lifting mesh after concrete pouring is not acceptable.
- E. Prepare concrete mixture including the following:
 - 1. Add hot weather or cold weather admixture to accommodate field weather conditions.
- F. Concrete Testing: Will be performed as described in Part 3, "Field Quality Control" of this specification section.
- G. Conveying:
 - 1. Convey concrete by means that will prevent segregation and loss of mortar from the mix.
 - 2. Provide adequate manpower and equipment in the form of buckets, buggies, chutes, conveyors or other approved means to assure continuous operation.
 - 3. Convey concrete so that no equipment with aluminum parts comes in contact with fresh concrete.
- H. Concrete Placement: Do not place concrete until subgrade and forms have been checked for line and grade. Moisten granular base course as required to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they have been brought to the required finish grade, alignment, and expansion joints have been installed.
- I. Spread concrete as soon as it is deposited on the granular base course, using methods which prevent segregation of the mix, and with as little rehandling as possible. Consolidate concrete along the face of forms. Consolidate with care to prevent dislocation of mesh, reinforcing and joint materials.
- J. Install Concrete Walk Joints:
 - 1. Construct expansion and contraction joints as detailed and as shown on plans. Concrete joints that do not follow the pattern(s) shown on the plans and/or

changes that have been approved by the Architect will be removed and replaced at no additional cost to the Owner.

2. When the walkway is abutting existing walks, place transverse joints to align with previously placed joints, unless otherwise shown.
3. Contraction Joints: Approximately 5' on center. Break walk into individual slabs of not more than twenty-five (25 sf) square feet with jointing tool, round edges. Saw cut scoring pattern (contraction joints) to depth shown on details for each type of concrete work with new, sharp concrete sawblade one day (24 hours) after the pour. Joint cuts to be clean, sharp, uniformly made cuts to achieve scoring pattern as shown and detailed. Note: When tooled joints or saw cutting is not performed as described, an extended three (3 yr.) year written guarantee or credit for defective work will be required as determined by the Architect at no additional cost to the Owner.
4. Expansion Joints: Provide where abutting building(s), columns, structures, concrete paving and curbs, catch basins, manholes, inlets, walks, walls, other fixed objects and as directed by the Architect.
5. Locate expansion joints at thirty feet on center (30' o.c.) for each walkway lane, unless otherwise shown. Provide slip dowels as detailed and specified.
6. Locate expansion joints with slip dowels at all flush building access points, whether specifically shown on drawings or not.
7. Extend joint fillers full width and depth of the joint, flush with finished pavement grade, and not less than 1/4" or more than 1/2" below the finished pavement surface. Joint surfaces shall be clean and dry prior to installation of sealant as per manufacturer's recommendations. Remove excess sealant on surfaces adjacent to joint.

K. Concrete Finishing:

1. Perform concrete finishing using machine or hand methods as required.
2. After striking off and consolidating concrete, smooth the surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.
3. After floating, test surface for trueness with a ten (10') foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous, smooth finish.
4. Work edges of slabs and joints with a 1/8" radius edging tool, two (2") wide, unless otherwise shown.
5. After completion of floating and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows.
6. Broom finish, by drawing a medium hair broom across the concrete surface as detailed. Repeat operation when required to provide a medium texture acceptable to the Architect.
7. For handicap curb ramps, tool grooves along sloping surfaces in line with drainage flow as detailed.
8. Curing: Refer to schedule noted in 1.6, above.
 - a. Immediately after placement, protect concrete from premature drying.
 - b. Remove all dirt, dust, oil, grease, asphalt and foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry.
 - c. Stir curing compound thoroughly before using.
 - d. Apply a continuous, uniform film by solvent-resistant low pressure spray only, short-nap roller or lamb's wool applicator. For best results, use a canister curing compound sprayer. Use spray tip number 8004 or equivalent for water-based or waterborne products.

- e. For curing, apply first coat evenly and uniformly as soon as possible after final finishing. Apply second coat when all construction is completed and structure is ready for occupancy.
- f. When soil contamination occurs, notify the Architect immediately in writing. Remove contaminated soils and legally dispose of, provide soil test(s), replace soil, plantings and lawns at no additional cost to the Owner.

3.02 FOOTINGS, BASES, FOUNDATIONS, AND THRUST BLOCKS

- A. Footings, Bases, Foundations: Locate and provide where shown on drawings and as detailed.
- B. Thrust Blocks: Locate and provide where shown on drawings. Also for sanitary force main and water pipes at (1) connections to existing systems, (2) at changes in horizontal alignment of 22-1/2 degrees or more, and (3) at tees, crosses, valves, hydrants and plug (end of pipe) conditions. Block and anchor with concrete so that there will be no movement of the pipe in the joints due to internal or external pressures. The concrete shall be placed around the fittings and completely fill the space between the fittings and walls of the trench, from 6" below the fittings of pipe, to 12" above the fittings. The anchor concrete shall be so placed that the bell and spigot joints or other joints may be recaulked or tightened if necessary. Concrete thrust blocks shall conform dimensionally to details shown on drawings.

3.03 INTERRUPTION OF CONCRETING

- A. Should placing concrete be suspended or unavoidably interrupted, provide key ways and bulkheads to prevent feather-edging when work is resumed. Roughen horizontal surface for bond.

3.04 REPAIR AND PROTECTION FOR CONCRETE WORK

- A. Cut out and replace defective concrete work which has blisters, cracking, crazing, curling, discoloration, dusting, efflorescence, low spots, pop outs, scaling or mortar flaking, spalling, settling, or heaving as defined by Portland Cement Association 2001, "Concrete Slab Surface Defects" and as directed by the Architect.
- B. Modify or replace concrete not conforming to the required lines, details, elevations and specifications as directed by the Architect.
- C. Protect the work from damage until acceptance of the work. Exclude traffic from concrete work for at least fourteen (14) days after placement. When construction traffic is permitted, maintain concrete as clean as possible by removing surface stains and spillage of materials as they occur.

3.05 DETECTABLE WARNING SYSTEM

- A. Pour and float concrete, set tile by tamping grid pattern down into the concrete until all air voids are removed with a rubber mallet.
- B. Place two cinder blocks or 25 lbs weights on the tile to prevent floating.
- C. Create an edge around the perimeter of the tile using a 3/8" radius edging tool then float the concrete around the tile's perimeter using a steel trowel.
- D. After concrete has cured, remove protective plastic wrap.

- E. Protect tiles against damage during construction and clean tiles as recommended by the manufacturer.

3.06 CONCRETE CURB

- A. The Contractor has the option to provide either cast-in-place reinforced concrete curb, or slip formed, (machine formed) concrete curb using NYSDOT Type J Concrete.
- B. General: Concrete Curb shall meet the requirements specified for concrete in this Section, Item 3.01 above. Install forms true to line and grades given on plan. Provide permanent in place expansion joints using pre-molded expansion joint filler thirty feet (30' o.c.) on center, maximum
- C. Finishing: Rub surface smooth with carborundum brick dipped in neat cement grout to fill pin holes. Troweled on cement plaster is prohibited. After drying, rub off excess cement dust with burlap.
- D. Curing: See 3.01, above.
- E. Slip-formed curbs: Expansion and contraction joints required as detailed including slip dowels at expansion joints.

3.07 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed by ACI certified technicians; Grade 1. Certificates shall be submitted to the Architect for persons performing inspection and testing prior to the start of work.
- B. Field Inspection and testing shall be paid for as directed under 1.5 "Quality Assurance". Where retesting, additional inspection, lab tests or other professional services are required due to rejected work, any cost associated therewith will be solely at the Contractor's expense.
- C. The Contractor shall plan his operations to allow adequate time for all required testing and inspection.
- D. The Contractor shall provide facilities and equipment necessary to obtain and handle representative sample of materials to be tested.
- E. The testing laboratory shall be responsible to the Owner for the field control of all concrete and may reject batches because of high slump, uncontrolled air entrainment, delays or other conditions of non-compliance with these specifications.
- F. Sampling and Field testing will be performed during concrete placement per ASTM C31, C39, C143, C172 and C173.
- G. Five (5) Concrete Test Cylinders: Taken for every 30 or less cubic yards of concrete placed are required or a fraction thereof;
 - 1. Two (2) Cylinders will be tested at 7 days, two (2) cylinders will be tested at 28 days and one (1) cylinder will be held for possible testing at a later time.
- H. One (1) Additional Test Cylinder: Taken during cold weather concreting, to be cured on the job site under the same conditions as placed concrete it represents, is required.

- I. Air Content Test: Taken for each set of test cylinders taken, is required.
- H. One (1) Slump Test: Taken for each set of test cylinders taken is required.
- K. Test results will be reported by telephone to the General Contractor and Architect on same day tests are made. Written report with copies will follow to the Owner, Architect, and Landscape Architect. Email copies of laboratory test, evaluation reports for concrete materials and mix designs will be submitted.

3.08 CLEAN UP

During the contract and at intervals as directed by the Architect and as concrete work is completed, clear the site of gravel, concrete, appurtenances and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION

SECTION 32 30 01

CONCRETE MODULAR RETAINING WALL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of concrete modular retaining wall (CMRW) is shown on the drawings.
- B. Retaining wall work includes, but is not limited to, the following:
 - 1. Concrete modular units – double faced
 - 2. Unit fill material
 - 3. Geogrid
 - 4. Filter Fabric
 - 5. Clean up

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 22 01 - Site Earthwork
- B. Section 33 40 01 – Storm Drainage
- C. Section 32 31 00 – Vinyl Chain Link Fence

1.03 SUBMITTALS (See Section 311201, 1.05)

- A. Provide Manufacturer's Product Data (MPD), Material certificates and samples as noted:
 - 1. Concrete modular unit(s): Sample and MPD
 - 2. Connecting pin: Sample and MPD
 - 3. Unit fill material: Sample and Material Certificate
 - 4. Geogrid: Sample and MPD
 - 5. Filter Fabric: Sample and MPD
 - 6. Underdrains: MPD
- B. Provide soil and in place density test results as specified in Sections 1.05 and 3.02 below.
- C. Substitutions: The Contractor is responsible for structural calculations certified by a NYS Registered Professional Engineer. Shop drawings must be reviewed and approved by the Architect.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall prevent excessive mud, wet cement, epoxy, and like materials which may affix themselves, from coming in contact with the materials.
- B. Contractor shall protect the materials from damage. Scratched, dis-colored, stained or chipped material shall not be incorporated into the retaining wall structure.

1.05 SOIL TESTING

As specified in Section 31 22 01, 1.04.

1.06 JOB CONDITIONS

- A. Job conditions in Section 31 22 01 apply.
- B. Grade Control: Establish and maintain required lines and elevations.
- C. Codes and Standards: Perform the work in compliance with NPCA Quality Control Manual for Precast Concrete Plants and Manufacturer's instructions. Perform the work in compliance with applicable requirements of governing authorities having jurisdiction. Obtain and pay for permits required by local authorities.
- D. Construction Review: Notify the Architect when the wall foundation course is complete. Also, when each wall is approximately 50% complete, or when the geo-grid is installed, prior to backfilling.

PART 2 - PRODUCTS

2.01 CONCRETE MODULAR UNITS

CMRW units will be subject to rejection when they do not meet any of the following criteria for Dry Cast Segmental Retaining Wall Units:

- A. Concrete modular units shall be manufactured in accordance with ASTM C-140 and ASTM C-1262, ASTM C1372. They shall have a minimum net 28-day compressive strength of 3,000 psi. The concrete shall have a maximum moisture absorption of four (4%) percent average.
- B. Masonry units shall be:
 - 1. Standard units, (12"H x 14"D x 72"L)
 - 2. Cap/ Copping unit, (12"H x 14"D x 72"L)
 - 3. Half Standard unit, (12"H x 14"D x 36"L)
 - 4. Closed-end coping units, (12"H x 14"D x 72"L)
 - 5. Corner units, (12"H x 12"D x 36"L)
- C. Shape: Straight face. (vertical – no batter)
- D. Face Texture: Smooth form finish
- E. Color: Standard grey concrete - Natural
- F. Standard of quality shall be concrete modular retaining wall **DURA-HOLD 2** as manufactured by **Unilock** (www.unilock.com) and distributed by Barns & Cone, 5894 Court Street, Syracuse, NY, (Tel. 315-437-0305) or Architect approved equal.

2.02 CONSTRUCTION ADHESIVE

Shall conform to UN-STD 1804, ASTM 2339-70 and FHA UM-60.

2.03 UNIT FILL MATERIAL

Free draining crushed stone, 3/8" to 3/4", no more than 5% passing the No. 200 sieve with a maximum size of one (1") inch. Pea gravel or coarse sand is not acceptable.

2.04 GEOGRID

- A. Geogrid shall be high density polyethylene expanded sheet or polyester woven fiber materials, specifically fabricated for use as soil reinforcement.
- B. Standard of quality shall be STRATAGRID 300, as manufactured by Conwed Plastics (1-800-888-5933); Miragrid ST as manufactured by MIRAFI, Inc., or Architect approved equal.

2.05 FILTER FABRIC

Shall be a commercially manufactured porous nonwoven polypropylene geotextile. Standard of quality shall be Mirafi 140N, Exxon 130D, or Architect approved equal.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Coordinate with testing service to inspect and test subgrades before further construction work is performed. Testing required:

One in-place density test for each 16-inches of fill up to and including at wall ends and at twenty (20') foot intervals along each wall. Round up to next highest number of tests required for each wall when remaining interval is less than 20-feet.
- B. Density Tests and Retesting: Refer to Section 31 22 01, 1.04., A through D.
- C. Only hand operated equipment shall be allowed within three (3') feet behind the wall.

3.02 CONCRETE MODULAR UNIT INSTALLATION

- A. First course of concrete wall units shall be placed on the existing wall foundation units. Check units for level and alignment. The proposed wall will be true vertical, (no batter setback).
- B. Units shall be in full contact with base.
- C. Backfill material shall be placed in eight (8") lifts and compacted to 95% density.
- D. Sweep excess material from top of units and install next course. Insure each course unit is completely filled, backfilled and compacted prior to proceeding to next course.
- E. Install units on successive courses to overlap joint on previous course.

3.03 GEOGRID INSTALLATION

- A. Geogrid soil reinforcement shall be laid horizontally on compacted backfill. Connect to the concrete wall units by locking geogrid over the unit fin tab. The grid is secured when the proceeding block is installed. Pull taut and anchor before backfill is placed on the geogrid.
- B. Remove slack in the geogrid at the wall unit connections.
- C. Install geogrid at proper elevation and orientation as shown on the construction drawings.
- D. Verify correct orientation (roll direction) of the geogrid.

- E. Pretension the geogrid. Pull pinned geogrid taut, eliminating loose folds and slack. Stake or otherwise secure back edge of geogrid prior to and during backfill and compaction.
- F. Follow manufacturer's guidelines relative to overlap requirements of uniaxial and biaxial geogrids.

3.04 FILL PLACEMENT

- A. Install storm water management trenches, (underdrains) as shown on the drawings.
- B. Place backfill material in eight (8") inch lifts and compacted to 95% of density.
- C. Place, spread, and compact backfill to minimize slack or loss of geogrid pretension.
- D. Only hand-operated compaction equipment shall be allowed within three (3') feet of the back surface of the units.
- E. Backfill shall be placed from the wall rearward into the embankment to insure that the geogrid remains taut.
- F. Tracked construction equipment shall not be operated directly on the geogrid. A minimum backfill thickness of six (6") inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.
- G. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

3.05 CAP INSTALLATION

- A. Provide permanent mechanical connection to wall units with construction adhesive. Apply adhesive to bottom surface of cap units and install on units below. Carefully apply adhesive to avoid spill-over on face of units.
- B. Place cap units over projecting fins from units below. Backfill and compact to finish grade.
- C. Install chink link fence. Core drill cap units and set fence posts with non-shrink grout as detailed.

3.06 CLEAN UP

During the contract and at intervals as directed by the Architect and as concrete modular retaining wall is installed, clear the site of extraneous equipment, concrete modular units, fabric, underdrain, gravel and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 32 30 01

SECTION 32 30 2

TRAFFIC SIGNS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of traffic signs are shown on the drawings.
- B. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.02 SUBMITTALS: (Provide Section 31 12 01, 1.05)

- A. Provide shop drawings for each different type and size of sign listed in the Traffic Sign Schedule.
- B. Provide MPD for sign posts and plates.

1.03 JOB CONDITIONS

- A. Job conditions in Section 312201 apply.
- B. No work shall be fabricated until shop drawings for the work have been favorably reviewed by the Architect.
- C. Construction Review: Notify the Architect when locations for signs are coordinated to avoid underground utilities and marked in the field for review.
- D. Existing signs that are salvaged may be reinstalled if in good condition. Replace posts to match new work.

PART 2 - PRODUCTS

2.01 SIGNS

- A. Sign Plate
 - 1. Sign Plate shall be aluminum sheets .090" (approximately 3/32") thick, with two coats of Dupont Imron spray semigloss paint.
 - 2. Letters, numbers, symbols, and arrows shall be engineering grade, (EG) reflective. Sign plates, letters and numbers shall meet the colors and regulations described in the "Manual of Uniform Traffic Control Devices", latest edition, as published by the State of New York Department of Transportation, Division of Traffic and Safety.
 - 3. The following Traffic Sign Schedule shall apply:

SIGN WORDING	QTY.	SIGN NO.	SIZE	LETTER SIZE AND SERIES
Stop	2	R1 - 1C	30" x 30"	10"C/White and Red
HC Reserved		P4 - 6C	12" x 18"	2" Green/White

Parking w/ Van Accessible	4	P3-8(NY)	12" x 6"	Blue Background 2" Green/White Background
No Parking Any Time	2	P1-1	12" x 18"	3"C/Red on White
EV Charging Station	4	Custom	12" x 18"	Green on White

4. Refer to Traffic Sign Schedule and/or sign details on drawings for sign wording, quantities, and other information.
5. Hardware shall be galvanized.
6. Standard of quality shall be as manufactured by Eastern Metal/USA-Sign, www.usa-sign.com or Architect approved equal.

B. Breakaway Signposts:

1. Shall be minimum 2.5 lbs. / ft high carbon new billet steel (SP-80) U-channel posts with predrilled 3/8" holes at 1" on center.
2. Crashworthy to NCHRP 350 criteria. Meeting FHWA (Federal Highway Administration) for small sign support applications.
3. Lap Splice U-channel Breakaway System shall be 3/8" x 3/4" x 5" and sized to post, bar color silver. Special manufacturer designed bolts for lap splice are required.
4. Hot dipped galvanized or Powder Coated Color as directed by the Architect.
5. Standard of quality shall be "Rib-Bak" U-channel signposts as manufactured by NUCOR Steel Marion, Inc. www.nucorhighway.com (800) 333-4011 or Architect approved equal.

PART 3 - EXECUTION

3.01 INSTALL SIGNS

- A. Erect signs plumb. Drive posts into firm ground or bolt to sleeve in pavement areas or concrete footings as detailed. Use driving caps to avoid deforming posts.
- B. Mount sign plates at heights detailed. Attach metal sign plates to steel posts securely with 1/4" galvanized allen head screws.
- C. Re-install existing signs that interfere with work operations. Replace sign posts to match new or return unused signs to the Owner.

3.02 CLEAN UP

During the contract and at intervals as directed by the Architect and as traffic sign installation(s) are completed, clear the site of extraneous paint, fasteners, concrete, gravel, asphalt and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION

SECTION 32 30 02

TRAFFIC SIGNS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of traffic signs are shown on the drawings.
- B. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.02 SUBMITTALS: (Provide Section 31 12 01, 1.05)

- A. Provide shop drawings for each different type and size of sign listed in the Traffic Sign Schedule.
- B. Provide MPD for sign posts and plates.

1.03 JOB CONDITIONS

- A. Job conditions in Section 312201 apply.
- B. No work shall be fabricated until shop drawings for the work have been favorably reviewed by the Architect.
- C. Construction Review: Notify the Architect when locations for signs are coordinated to avoid underground utilities and marked in the field for review.
- D. Existing signs that are salvaged may be reinstalled if in good condition. Replace posts to match new work.

PART 2 - PRODUCTS

2.01 SIGNS

- A. Sign Plate
 - 1. Sign Plate shall be aluminum sheets .090" (approximately 3/32") thick, with two coats of Dupont Imron spray semigloss paint.
 - 2. Letters, numbers, symbols, and arrows shall be engineering grade, (EG) reflective. Sign plates, letters and numbers shall meet the colors and regulations described in the "Manual of Uniform Traffic Control Devices", latest edition, as published by the State of New York Department of Transportation, Division of Traffic and Safety.
 - 3. The following Traffic Sign Schedule shall apply:

SIGN WORDING	QTY.	SIGN NO.	SIZE	LETTER SIZE AND SERIES
Stop	2	R1 - 1C	30" x 30"	10"C/White and Red
HC Reserved		P4 - 6C	12" x 18"	2" Green/White

Parking w/ Van Accessible	4	P3-8(NY)	12" x 6"	Blue Background 2" Green/White Background
No Parking Any Time	2	P1-1	12" x 18"	3"C/Red on White

4. Refer to Traffic Sign Schedule and/or sign details on drawings for sign wording, quantities, and other information.
5. Hardware shall be galvanized.
6. Standard of quality shall be as manufactured by Eastern Metal/USA-Sign, www.usa-sign.com or Architect approved equal.

B. Breakaway Signposts:

1. Shall be minimum 2.5 lbs. / ft high carbon new billet steel (SP-80) U-channel posts with predrilled 3/8" holes at 1" on center.
2. Crashworthy to NCHRP 350 criteria. Meeting FHWA (Federal Highway Administration) for small sign support applications.
3. Lap Splice U-channel Breakaway System shall be 3/8" x 3/4" x 5" and sized to post, bar color silver. Special manufacturer designed bolts for lap splice are required.
4. Hot dipped galvanized or Powder Coated Color as directed by the Architect.
5. Standard of quality shall be "Rib-Bak" U-channel signposts as manufactured by NUCOR Steel Marion, Inc. www.nucorhighway.com (800) 333-4011 or Architect approved equal.

PART 3 - EXECUTION

3.01 INSTALL SIGNS

- A. Erect signs plumb. Drive posts into firm ground or bolt to sleeve in pavement areas or concrete footings as detailed. Use driving caps to avoid deforming posts.
- B. Mount sign plates at heights detailed. Attach metal sign plates to steel posts securely with 1/4" galvanized allen head screws.
- C. Re-install existing signs that interfere with work operations. Replace sign posts to match new or return unused signs to the Owner.

3.02 CLEAN UP

During the contract and at intervals as directed by the Architect and as traffic sign installation(s) are completed, clear the site of extraneous paint, fasteners, concrete, gravel, asphalt and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION

SECTION 32 31 00

VINYL CLAD CHAIN LINK FENCE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of vinyl clad chain link fence is shown on the drawings and includes, but is not limited to, the following:
 - 1. New 48-inch-high vinyl clad chain link fence.
- B. Provide all materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 312201 - Site Earthwork
- B. Section 323001 – Concrete Unit Masonry Retaining Wall

1.03 REFERENCES

- A. ASTM F552 Standard Terminology Relating to Chain Link Fencing
- B. ASTM F567 Standard Practice for Installation of Chain Link Fence
- C. ASTM F626 Standard Specification for Fence Fittings
- D. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric
- E. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates
- F. ASTM F934 Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials
- G. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
- H. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- I. ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates.
- J. WLG 2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing.

1.04 SUBMITTALS

- A. Provide Qualification Experience requirements as specified in "Quality Assurance" of this section. Provide a list of completed projects including Owner contact information.
- B. Manufacturer's Product Data (MPD): Manufacturer's catalog cuts indicating material compliance and specified options.

- C. Shop Drawings: For fence, including plan layout and details illustrating fence heights, location and sizes of posts, finishes, rails, braces, and installation procedures. Provide footing sizes and hardware list.
- D. Samples:
 - 1. 4" section of line post with specified vinyl coating.
 - 2. 12" x 12" section of vinyl fence fabric .
- E. Provide a copy of manufacturers 15-year warranty.

1.05 JOB CONDITIONS

- A. All job conditions in Section 31 22 01 apply.
- B. Construction Review: Notify the Architect when fence and gates are staked out.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Company having manufacturing facilities in the United States with five (5) years experience specializing in manufacturing of chain link fence products.
- B. Fence Contractor: Contractor having five (5) years experience installing similar projects in accordance with ASTM F567.
- C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.
- D. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

1.07 WARRANTY

- A. Provide manufacturer's standard limited warranty that its chain link fence system is free from defects in material and workmanship including cracking, peeling, blistering and corroding for a period of fifteen (15) years from the date of purchase.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Vinyl Chain Link Fence: Shall conform to Chain Link Fence Manufacturer's Institute specifications. See drawings for sizes of posts and fabric.
- B. All posts, rails, fittings, fabric and tension bars shall be vinyl coated galvanized steel, painting of these items will not be acceptable.
- C. Color System: All posts, rails, fittings, fabric, hardware, and tension bars shall be black in compliance with ASTM F934.
- D. Standard of quality: shall be Color Bond II, Class 2b as manufactured by Merchant Metals, (888) 260-1600 or Architect approved equal.

2.02 CHAIN LINK FABRIC

- A. The base metal of chain-link fabric is composed of commercial quality medium high carbon, hot-dipped galvanized steel wire. Core wire tensile strength 75,000 psi.
- B. The vinyl coating is securely fused over the galvanized steel wire by the Thermal Fusion process under pressure to 5,000 psi to insure a dense and impervious covering free of voids, having a smooth and lustrous surface appearance. The vinyl coating thickness, 6 mil (0.15 mm) to 10 mil (0.25 mm), zinc coating weight, and wire tensile strength conforms to ASTM F668 Class 2B. The wire shall be vinyl clad before weaving and is free and flexible at all joints. The mesh is measured by the distance between the wires forming parallel sides of the mesh. The height of the fabric, measured from the ends of the knuckles, has a permissible variation of plus or minus one inch.
- C. Wire Coating: Only Plasticized Polyvinyl Chloride (PVC) with low temperature (-20 degrees C.) plasticizer, no fillers, extenders or extraneous matter, other than the necessary stabilizers and pigments are used. Colors are stabilized and have a light fastness that withstands a minimum WEATHER-O-METER exposure of 4,000 hours without any deterioration (Test Equipment Operating Light and Water Exposure Apparatus Carbon-Arc Type) ASTM-D 1499. The vinyl covering, in addition, resists attack from prolonged exposure to diluted solutions of most common mineral acids, sea water and diluted solutions of most salts and alkali.
- D. Fabric is knuckled at both selvages (top and bottom). Any twisted salvage will be rejected.

Usage	Mesh Size	Break Load of Wire	Thermally Fused -Vinyl Coated Core Wire Gauge
Standard	2" (50 mm)	1290 lbF	9 ga. [0.148" (3.76 mm)]

2.03 STEEL PIPE FRAME WORK

- A. Steel pipe Type I: ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface. Exterior of pipe to have ASTM F1043 PVC thermally fused color coating, minimum thickness 10 mils (0.254 mm) to 15 mils (0.38 mm). Regular Grade: Minimum steel yield strength of 30,000 psi (205 MPa) [all sizes]
- B. Top, Intermediate and Bottom Rails: Top rail is thermally fused vinyl coated galvanized steel pipe in 21 foot lengths jointed by 7" inches long sleeves, vinyl clad, to run continuously along top of fence. Bottom and intermediate rails shall conform to specifications for top rail and are jointed at line posts with vinyl clad boulevard clamps.
- C. Line Posts: Line posts are thermally fused vinyl coated galvanized steel pipe. Posts are sufficient length to allow for installation as detailed and are spaced in the line of fence not farther apart than 10 feet.
- D. Terminal and Corner Posts: Shall be thermally fused vinyl coated galvanized steel. Each post is of sufficient length to allow for a depth as detailed. Fabric is attached to the terminal post by means of vinyl coated tension bars and held by vinyl coated tension bands. Corner posts are placed at each change in direction or as directed by the Architect. All corner and terminal posts are braced with vinyl-clad galvanized steel 1.66

inch O.D. brace, rail, 10 feet long, with a diagonal 3/8 inch diameter truss rod, and attached to the first adjacent line post.

2.04 FITTINGS

- A. All fittings to be PVC thermally fused color coated having a minimum thickness of 0.006" (0.152 mm) per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.
- B. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. For top rail, provide line post loop tops to secure top rail.
- C. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.
- D. Top rail sleeves: 7" (178 mm) PVC coated galvanized steel sleeve per ASTM F626 that allow for expansion and contraction of rail.
- E. Wire ties: 9 gauge (0.148") (3.76 mm) vinyl coated galvanized steel wire for attachment of fabric to line posts and rails. Tie wire PVC coated and in compliance with ASTM F626. Color to match fabric color.
- F. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105") (2.67mm) pressed vinyl coated steel by 3/4" (19mm) formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16" (7.94 mm) galvanized carriage bolt and nut.
- G. Tension (stretcher) vinyl coated galvanized steel bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" (4.76 mm x 19 mm) per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.
- H. Truss rod assembly: PVC coated galvanized steel minimum 5/16" (7.9mm) diameter truss rod with pressed steel tightener, in accordance with ASTM F626.
- I. Carriage bolts and nuts: Galvanized of commercial quality but not vinyl coated. Provide PVC touchup paint to color coat all nuts and bolts, when fence is completed.

2.05 FENCE MOUNTING (ANCHORING)

- A. Anchoring cement: Sika Grout 328 non-shrink, non-metallic, cementitious precision grout. ASTM C 1107 (Grade B & C).

PART 3 - EXECUTION

3.01 SITE EXAMINATION AND PREPARATION

- A. Field Verify locations and limits.
- B. Verify areas to receive fencing are completed to final grade with finished elevations shown on the drawings.

3.02 CHAIN LINK FRAMEWORK INSTALLATION

- A. Install chain link fence system in accordance with ASTM F567, manufacturer's instructions, and Chain Link Fence Manufacture's Institute specifications.
- B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.
- C. Space line posts uniformly maximum ten (10') feet on center.
- D. Anchoring in concrete: Core drill holes of diameters, depth and spacings shown. Core drill holes with tolerance for post diameter and grout.
- E. Setting Posts: Remove all loose and foreign materials from sides and bottoms of holes.
 - 1. Center and align posts in holes. Install posts plumb, in neat, straight lines, and with minimal waviness of top railing.
 - 2. Place grout around posts in a continuous application and tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
 - 3. Trowel grout flush with finish grade to prevent water from collecting around the post. Provide expansion joint caulking around the post if grout is not flush with finish grade.
- F. Grout Strength: Allow grout to attain full design strength. Or per manufacturers recommendations before rails, tension bands or fabric is installed. Do not stretch and tension fabric and wires until full design strength is obtained.
- G. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
- H. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6' (1829 mm) and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.
- I. Top rail: Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.
- J. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.
- K. Fasteners: Peen ends of bolts or score threads to prevent removal of nuts. Paint all exposed surfaces, nicks or scratches, nuts and bolts, with liquid black PVC touch up paint.

3.03 CHAIN LINK FABRIC INSTALLATION

- A. Fabric: Install fabric on security side or play side for athletic facilities as directed by the Architect, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15" (381 mm) on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is above finish grade as detailed.

- B. Secure fabric using wire ties to line posts at 12" on center and to rails and braces 12" on center. Tie wire shall be secured to the fabric by wrapping it two (2), 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.04 CLEAN UP

- A. During the contract and at intervals as directed by the Architect and as chain link fence, backstop and gate installation is completed, clear the site of all extraneous concrete, gravel, fence material or debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION

SECTION 32 90 01

PLANTING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of planting is shown on the drawings.
- B. Planting work includes, but is not limited to, the following:
 - 1. Imported planting soil
 - 2. Planting commercially grown plant materials
 - 3. Planting accessories
 - 4. Maintenance: See watering, weed control and other specific requirements
 - 5. Guarantee
 - 6. Clean up
- C. The Contractor shall provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 22 01 - Site Earthwork
- B. Section 32 92 01 - Lawns

1.03 SUBMITTALS (See Section 31 12 01, 1.05)

- A. Furnish name of Landscape Contractor and/or Nurseryman to perform planting work and obtain Architect's approval.
- B. Provide Material Certificates, MPD, Test Reports or Samples as noted for:
 - 1. Mulch: Twelve (12 oz.) ounce sample
 - 2. Planting Soil Mixture: Material Certificate and Test Report. See 1.04 F.
 - 3. Plant Materials: Certificates of Inspection by regulatory agencies. Leave tags with botanical names and nursery source(s) on plants until reviewed by Architect.

1.04 QUALITY ASSURANCE

- A. Perform planting in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Planting Contractor: Planting work by established Landscape Contractor and/or Nurseryman having sufficiently experienced crews, supervisor(s), specialized equipment and an excellent record of performance on completed planting projects of comparable size, scope, and quality. Provide expert plantsman to direct the work in the field on a regular, daily basis.
- C. Nomenclature: Plant names shall conform to the latest edition of "Standardized Plant Names" as adopted by the American Joint Committee of Horticultural Nomenclature. Plants shall be true to botanical name, tagged with a waterproof, legible tag showing botanical name, size, and nursery source of origin.

- D. Size and Grading: Plant sizes and grading shall conform to the latest edition of "American Standard for Nursery Stock" as sponsored by the American Association of Nurserymen, Incorporated (AAN), latest issue unless otherwise specified.
- E. Nursery Source: Obtain freshly dug, healthy, vigorous, plants nursery grown under climatic conditions similar to those in the locality of the project for a minimum of two (2) years. Plants shall have been lined out in rows, annually cultivated, sprayed, pruned, and fertilized in accordance with good horticultural practice. Plants shall have been transplanted or root pruned at least once in the past three years. Balled and burlapped plants must come from soil which will hold a firm root ball. Heeled in plants and plants from cold storage not accepted.
- F. Testing:
 - 1. Engage an independent, qualified State of New York soil testing service. Pay for soil testing and inspection services.
 - 2. Test representative material samples proposed for use as follows:
 - a. Planting Soil Mixture
 - (1) pH factor
 - (2) Mechanical analysis
 - (3) Percentage of organic content
 - (4) Recommendations on type and quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.
 - b. Peat Moss
 - (1) Loss of weight by ignition
 - (2) Moisture absorption capacity
 - c. Bone Meal

1.05 JOB CONDITIONS

- A. Job conditions in Section 31 22 01 apply.
- B. Planting seasons and timing conditions:
 - 1. Proceed with and complete planting work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.
 - 2. Do not conduct planting operations until fine grading in the work areas has been completed satisfactorily.
 - 3. Cooperate with other Contractors and trades working in and adjacent to planting locations. Examine drawings and specifications for the entire site and become familiar with the scope of other work required, especially underground utilities.
- C. Construction Review:
 - 1. Plants must be reviewed by the Architect before planting, either at the site or at the nursery.

2. Notify the Architect forty-eight (48) hours prior to delivery of plant materials to the site.
 3. Plants not meeting specifications or not installed according to drawings may be rejected at any time by the Architect.
- D. Provide plants of the species, size, and special characteristics noted on the Plant List. Substitutions not permitted unless approved in writing by the Architect. In the event that quantity discrepancies or material omissions occur in the Plant List, the planting drawings shall govern.
- E. Contractor shall provide labor, water, hoses, sprinklers and watering equipment.

PART 2 - PRODUCTS

2.01 PLANTS

- A. Plants shall be well formed without voids and open spaces, typical of their species or variety, with normal habit of growth. Plants shall be first quality, sound, healthy, vigorous, well branched and densely foliated. Plants shall have healthy, well developed fibrous root systems. They shall be free of defects, disfiguring knots, sun-scald injuries, frost cracks, abrasions, disease, insect pests, eggs, and larvae.
- B. Plants shall conform to the measurements specified in the Plant List. Measurements specified shall be minimum size acceptable for each variety. For each plant of minimum size, provide a plant of maximum size. Plants that meet the requirements specified in the Plant List, but do not possess a normal balance between height and spread will not be accepted. Plants for use when symmetry is required, or in rows, shall be matched as nearly as possible. Plants shall not be pruned prior to delivery.
- C. Plants and tree trunks shall be measured when the branches are in their normal position. Dimensions for height and spread as contained herein refer to the main body of the plant and not from branch-tip to branch-tip. Shade trees shall be free of branches up to seven feet, with a single leader, well branched and reasonably straight stems. No trees which have had their leaders cut or damaged will be accepted. Trees must have straight trunks with single leader intact. There shall be no abrasion of the bark and no fresh cuts of limbs over one (1") inch which has not been completely calloused over.
- D. Balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock." Cracked or mushroomed balls are not acceptable.
- E. Container-grown stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
1. No plants shall be loose in the container.
 2. Container stock shall not be pot bound.

2.02 PLANTING ACCESSORIES

- A. Planting soil mixture for trees, shrubs, perennials and plant beds shall be premixed in bulk, and contain the following by volume:
- 20 parts clean imported soil
10 parts topsoil

1 part bone meal

- B. Topsoil: 10-20% organic, 20-65% passing 200 mesh sieve. Fertile, friable, natural topsoil of leafy character, without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sand, stones, plants, roots, sticks, and other foreign materials, with acidity range of between pH 6.5 and 7.5, free of substances harmful to plants which will be grown in the soil.
- C. Starter Fertilizer: Water soluble fertilizer and plant food 10-52-17 containing no sulfate or chloride salts. Standard of quality shall be as manufactured by Fairlawn Chemical Co., Inc., 485 Holt Road, Webster, NY (716) 671-2400, and distributed by Organix, 569 Klem Road, Webster, NY (716) 787-2711 or Architect approved equal.
- D. Peat Moss: Brown to black in color, weed and seed free, dried sphagnum peat moss, containing not more than 9% mineral on a dry basis and conforming to NYSDOT 713-20.
- E. Bone Meal: Finely ground, raw, minimum 4% nitrogen and 20% phosphoric acid. It shall be delivered in sealed bags showing the manufacturer's guaranteed analysis.
- J. Mulch: Shredded hardwood bark, (natural brown color).

PART 3 - EXECUTION

3.01 LAYOUT: Locate and stake in the field individual trees, shrubs, and plant beds for approval by the Architect prior to commencing planting operations.

3.02 GENERAL PLANTING OPERATIONS

- A. Transportation and Handling: Take precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants to foliage with an approved "Anti-Desiccant" immediately after digging to prevent dehydration. Dig, pack, transport, and handle plants with care to ensure protection against injury. Do not hold or move trees by stems. Support and protect root balls.
- B. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the Architect.
- C. Protect plants from drying out. When plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Architect. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Cover plants transported on open vehicles with protective covering to prevent wind burn. Do not hold or move trees by stems. Support and protect root balls.
- D. Provide dry, loose prepared planting soil for planting bed mixes. Frozen or muddy soil is not acceptable.
- E. Excavate tree pits, shrub and planting beds as dimensioned and located on drawings. When soils harmful to plant materials are encountered, immediately notify the Architect. **Each tree shall have a minimum of 150 cubic feet of planting soil.** Shrub planting pits shall be continuous when grouped as a mass, (shrubs planted as individual pits will not be acceptable).

- F. Plants shall be set plumb and straight and at such a level that after settlement, a normal or natural relationship of the crown of the plant with the ground surface will be established. Each plant shall be planted in the center of the pit. When balled, burlapped, and platformed plants are set, the platform shall first be removed from the pit and topsoil shall be carefully tamped under and around the base of each ball to fill voids. Burlap, ropes, and wires shall be removed from the sides and tops of balls, but no burlap shall be pulled out from under the balls.
- G. Plants shall be planted in the planting soil mixture which shall be thoroughly watered and tamped. On level ground or slight slopes, a shallow basin a little larger than the diameter of the plant pit shall be left around each plant as shown on the drawings or as directed by the Architect. On steep slopes, the soil on the lower side of the plant shall be graded in such a manner that it will catch and hold water as shown on the drawings or as directed by the Architect.
- H. Mulching: Spread continuous four (4") inches settled depth of mulch over finished surface of each plant, plant bed, or hedge trench as detailed. Water plants thoroughly after mulching. NOTE: The Architect may field check depth of mulch for proper weed control barrier since no weed control fabric is required.
- I. Pruning: Each shrub shall be pruned to preserve the natural character of the plant. Remove dead wood and crossing branches. Do not prune terminal leaders. Refer to drawings for additional tree pruning details.
- J. Replacements: Remove and immediately replace plants, as determined by the Architect, to be unsatisfactory during the initial planting installation.

3.03 MAINTENANCE

- A. Maintenance by Contractor begins as soon as plants are installed. Protect plants from drought, washout and wind erosion. In general, maintain new plantings, including watering, weeding, pruning, applications of herbicides, fungicides, insecticides and pesticides, until healthy, vigorous plants are accepted by the Architect. Specifically:
 - 1. Protect: Protect plantings against harsh weather, trespass and vandalism by wrapping, staking, temporary fencing or other means.
 - 2. Water: The Contractor shall provide water, labor, hoses, sprinklers and watering equipment to maintain plants, prevent them from drying (browning) out, and keep plants in a healthy, growing condition until final acceptance.
 - 3. Cultivate: Cultivate plants by straightening any settled plant materials, restaking and guying, rewinding, pruning dead and broken branches, weeding and re-applying anti-desiccant, herbicide, fungicide, insecticide and pesticide.
 - 4. Should the Contractor fail to protect and maintain the plantings, the Owner may issue a three (3) day notification to the Contractor, hire work done, and backcharge this Contractor.
- B. Maintenance by the Contractor continues until Certificate of Final Acceptance, or Final Punch List is satisfactorily completed and accepted by the Architect, whichever is later. Maintenance by Owner begins as soon as the Architect issues Certificate of Final Acceptance or Final Punch List is satisfactorily completed and accepted by the Architect, whichever is later.

3.04 STANDARDS FOR ACCEPTANCE: Review to determine acceptance of plantings will be made by the Architect upon request. Provide notification at least five (5) working days before requested review date.

- A. New plantings will be acceptable provided requirements, including maintenance, have been complied with. Healthy, well-formed, vigorous plants, true to species and size on Plant List, must be established, free of disease, broken branches and insects.
- B. Any plant which is poorly formed, structurally unsound, not true to species and size on Plant List, diseased, contains broken branches, or is generally unhealthy (containing 25% or more browned out foliage), shall be rejected and replanted at no additional cost to the Owner.

3.05 GUARANTEE

- A. Contractor shall guarantee plant materials to be true to species and size on Plant List, and in vigorous growing condition, for a period of one (1 yr.) year from the date given on the Certificate of Substantial Completion or Final Punch List is satisfactorily completed and accepted by the Architect, whichever is later.
- B. Any plant material that does not meet the Standards for Acceptance shall be replaced as soon as weather conditions permit. Replacement plantings shall be made in accordance with the specifications and drawings. Replacements shall be subject to inspection, acceptance, and guaranteed for one (1 yr.) year after date of replanting and acceptance by the Architect.

3.06 CLEAN UP

During the contract and at intervals as directed by the Architect and as planting is completed, clear the site of extraneous materials, pots, flats, hose, wire, stakes, pruned branches, rubbish, and debris. Leave the site in a clean, safe, neat, well draining condition.

END OF SECTION

SECTION 32 92 01

SEEDED AND SODDED LAWNS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of the lawn work is shown on the drawings. The lawn work limits equal the Contract Limit Line except as noted on the drawings. Non-paved, non-roofed areas within the Contract Limit Line shall receive four (4") inches settled depth of topsoil and lawn seed or sod. Existing lawn areas that are not disturbed require no additional work. Lawn types as shown on the drawings are defined as follows:
 - 1. Lawn Type 1: Strip and stockpile 4" topsoil, remove debris, replace 4" topsoil, seed, and mulch.
 - 2. Lawn Type 2: Strip, stockpile 4" topsoil, remove debris, replace 4" topsoil, seed and straw mat.
 - 3. Lawn Type 3: Strip and stockpile 4" topsoil, remove debris, replace 4" topsoil, and sod.
- B. Seeded lawns shall include all disturbed areas located **outside** the paved loop. Sodded lawns shall include all disturbed areas **inside** the paved loop road, not including plant beds.
- C. Lawn work includes, but is not limited to, the following:
 - 1. Placing and spreading screened stockpiled topsoil
 - 2. Sod bed preparation
 - 3. Seed bed preparation
 - 4. Seeding and sodding lawns
 - 5. Mulching and fertilizing
 - 6. Straw mat stabilization
 - 7. Maintenance: See watering, mowing, fertilizing, weed control, grow in and other specific requirements.
 - 8. Clean Up
- D. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 12 01 - Site Preparation (Topsoil Stripping)
- B. Section 31 22 01 - Site Earthwork

1.03 REFERENCES

- A. ASTM D4972 - Standard Test Method for pH of Soils
- B. ASTM D5268 - Standard Specification for Topsoil Used for Landscaping Purposes
- C. ASTM D422 and D1140 - Standard Test Method for Particle Size Analysis of Soils
- D. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effect

- E. ASTM F1647 - Standard Test Method for Organic Material Content of Athletic Field Rootzone Mixes.
- F. ASTM F1632 - Standard Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sportsfield Rootzone Mixes
- G. ASTM F2060 - Standard Guide for Maintaining Cool Season Turfgrasses on Athletic Fields
- H. National Turfgrass Federation, Inc.
- I. National Turfgrass Evaluation Program (NTEP).
- J. Cornell Universities: Sportsfield Management Guidelines
- K. Turfgrass Producers International: Guideline Specifications to Turfgrass Sodding, latest edition.

1.04 SUBMITTALS: (See Section 31 12 01, 1.05)

- A. Furnish name of Landscape Contractor or Nurseryman to perform lawn work and a list of completed projects including contact information for each project demonstrating compliance with applicable qualification requirements outlined in 1.5 "Quality Assurance" of this specification section.
- B. Provide Material Certificates and MPD for:
 - 1. Sod species and source, location for sod producer
 - 2. Seed species and source
 - 3. Limestone
 - 4. Fertilizers
 - 5. Hydromulch
 - 6. Straw mat - MPD only
 - 7. Straw (dry mulch) - location of straw producer
- C. Provide Topsoil Test Report (for Onsite Topsoil): Submit test results from Architect approved independent testing laboratory on their letterhead. Report shall:
 - 1. Certify soil texture, organic content, and particle size analysis.
 - 2. Chemical analysis testing nitrogen, phosphorus, potassium, calcium, magnesium, cation exchange capacity, base saturation percentages, micronutrients and acidity (pH).
 - 3. Provide timing and rates of soil additives, liming and fertilizers. (Materials and procedures regarding soil amendments and fertilizers specified in this section are approximate.) Adjust all soil amendments to comply with test results based on actual soil tests and as directed by the Architect at no additional cost to the Owner.
- D. Provide letter on Contractor's letterhead certifying that only topsoil from the above tested source was used on the project.

- E. Lawn Seed Mix: Submit one (1 lb.) pound seed sample for each mix specified in supplier's unopened package with supplier's certification statement clearly showing the following:
1. Name and address of labeler
 2. Lot number
 3. Kind and variety of turfgrass seed listed in order of predominance
 4. Percent by weight of pure seed of each species and variety (percent purity)
 5. Germination percentage (percent viable seed)
 6. Percent by weight of other crop seed
 7. Percent by weight of weed seed
 8. Percent undesirable grass seed
 9. Percent by weight of inert matter
 10. Date on which the germination test was conducted
- F. Submit seed tags from **ALL** used or partially used seed bags. At times throughout the project, the Architect may request seed samples of onsite seed bags.
- G. Provide schedule for review and approval as outlined under "Sequence and Scheduling" of this specification section.

1.05 QUALITY ASSURANCE

- A. General: Work shall be contracted to a single, established Landscape Contracting or Nursery firm having sufficiently experienced crews, supervisor(s), specialized equipment, and an excellent record of performance on completed lawn and athletic field projects of comparable size, scope, and quality. Provide expert turfman to direct the work in the field on a regular, daily basis. The expert turfman shall be employed by the same company engaged in the installation of the lawn and athletic field work for a minimum of five (5) years.
- B. Sod Standards: Comply with the Turfgrass Producers International: Guideline Specifications to Turfgrass Sodding, latest edition.
- C. Nomenclature: Seed names shall conform to the National Turfgrass Federation, Inc.
- D. Seed Quality Rating: Shall meet testing standard for New York State outlined by the National Turfgrass Evaluation Program (NTEP).
- E. Testing: If required by the Architect for poor lawn grow in, engage an Architect approved independent, qualified New York State testing service and turfgrass specialist to evaluate Contractor grow in practices and materials used. Pay for all testing/inspection services, materials, and manpower to correct lawn areas as approved by the Architect.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Sod:
1. Cut, deliver, and install sod within a 24-hour period. Sod cutting and shipping shall be coordinated with the sod installers.
 2. Do not harvest or transport sod when moisture content may adversely affect sod survival.
 3. Protect sod from sun, wind, and dehydration prior to installation.

4. Do not tear, stretch or drop sod during handling and installation.
5. Store sod materials at site in an orderly manner at location(s) acceptable to the Architect.

B. Seed:

1. Packing and Shipping: Ship seed and associated materials with certificates of inspections required by governing authorities.
2. Do not make substitutions. If specified seed material is not obtainable, submit to the Architect proof of non-availability and a proposal for use of equivalent material with similar performance criteria as the originally specified seed material.
3. Store all seed at the site in a cool, dry place in a manner to prevent wetting and deterioration, as approved by the Architect. Replace any seed damaged during storage as directed by the Architect.
4. Deliver seed in supplier's unopened packages bearing labels showing the supplier's name and seed analysis by weight.

C. Fertilizer:

1. Deliver fertilizer in the manufacturer's standard sized bags showing the weight, analysis, and manufacturer's name. Store all fertilizer under a waterproof cover or in a dry place as approved by the Architect.

1.07 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Lawn Work:

1. Perform lawn work after planting, fine grading and other work affecting the ground surfaces in the lawn work areas has been completed satisfactorily.
2. Where practical, the Owner will provide a connection to the water system such as, but not limited to, existing yard hydrants, building hose bibs, etc. If this source is insufficient, not available or practical to provide a source of sufficient water to meet the requirements herein, the Contractor shall secure a water source sufficient to meet the water requirements herein such as, but not limited to, municipal hydrants, water truck, etc. at no additional cost to the Owner.
3. Contractor shall provide all watering equipment and appurtenances such as, but not limited to, meters, backflow preventer, labor, hoses, sprinklers, irrigation and watering equipment. The Owner will pay for the water usage.
4. Calendar dates for seeding and sodding under "Sequence and Scheduling" of this specification section shall apply.
5. Place sod only when ground surface is free of mud, frost, snow and ice.
6. For General Lawn Type 1 and 2, perform lawn seeding using mechanical and hand seeding methods. Hydromulching is not permitted within ten (10') feet of buildings edges.

7. Protect newly seeded/sodded lawns from vehicles, vandalism, or trespass. Provide temporary fencing or barriers as required.
- C. Construction Review:
1. Upon completion of topsoil spreading and sod and/or seed bed preparation, notify Architect to review work.
 2. The Architect may review fine graded areas by the Contractor to check for surface smoothness and general compliance with grading requirements. Fill or cut by hand raking or other acceptable means to achieve smooth, even well-draining lawn surfaces free of "bird baths" and breaks in grade as directed by the Architect at no additional expense to the Owner.

1.08 SEQUENCING AND SCHEDULING

- A. Schedule: Prior to construction, provide a schedule which addresses the following lawn thresholds involving erosion control stabilization and competitive use of playfields:
1. Seeding and Sodding Installation: The Contractor may invoice for 50% of the approved schedule of value breakdown at the time of acceptable installation.
 - a. Unless otherwise directed in writing by the Architect, seed and sod lawns from April 1 to May 15, and from August 15 to October 1. Seeding and sodding between May 16 and August 14 is not acceptable unless adequate water supply is available and applied to the turfgrass as required herein and approved by the Architect.
 - b. Proceed with and complete seeding and sodding as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.
 2. Substantial Completion: At this time, the Architect may issue the Notice of Termination to satisfy the NYS DEC stabilization requirements. The date of substantial completion is anticipated approximately 60 days after lawn installation presuming all Contractor maintenance operations have been vigorously performed.
 3. Final Acceptance: The Contractor may invoice for the final 50% of the approved schedule of value breakdown at the time of final acceptance as described in Part 3, "Standards For Final Acceptance Of Lawns" of this specification section.
 4. Owner Maintenance: After final acceptance of the lawns, the Owner will maintain.

PART 2 - PRODUCTS

2.01 TOPSOIL

- A. Source: Provide from off site, Architect approved source, when stripped, stockpiled and amended quantity is inadequate to provide four (4") inches settled depth of topsoil for all lawn areas at no additional cost to the Owner.
- B. Texture and Content: Provide topsoil conforming to the following:

1. Soil texture and content:
 - a. Sandy loam topsoil, well drained homogeneous texture and of uniform grade, without the admixture of subsoil material. Topsoil shall be entirely free of dense material, hardpan, clay, stones over 3/4" in diameter, sod, or any other objectionable foreign material, including but not limited to, glass, debris, toxins, hazardous wastes and chemicals (such as atrazine or muriatic acid within the past seven (7) years) that may be injurious to humans, animals and plant materials.
 - b. Organic Matter: Containing not less than 5% or more than 10% organic matter in that portion of a sample passing a 1/4" sieve when determined by the wet combustion method on a sample dried at 105 degrees F.
2. pH Value: Containing a pH value within the range of 6.0 to 7.0 on that portion of the sample which passes a 1/4" sieve.
3. Soluble salt content: Not higher than 500 parts per million.
4. Sieve Analysis for general lawn work: Shall be screened or rock picked to meet the following gradation:

<u>Sieve Designation</u>	<u>% Passing</u>
3/4"	100
1/4"	97-100
No. 200	20-65 (of the 1/4" sieve)
5. Sieve Analysis for Athletic Field lawn work: Shall be mechanically screened by an onsite screening facility provided by the Contractor prior to placing and spreading. Athletic field topsoil shall meet the above sieve requirements.
- C. No lawn shall be seeded or sodded on topsoil that has been chemically treated until sufficient time has elapsed to permit dissipation of all toxic materials. The Contractor shall assume full responsibility for any loss or damage to turfgrass sod or the inability to grow a sufficient stand of grass from seed, as indicated herein, arising from improper use of chemicals or due to failure to allow sufficient time to permit dissipation of toxic residues, whether or not such materials are specified herein.

2.02 LAWN SEED MIX

- A. Provide fresh, clean, new-crop seed mixed in the proportions specified for species and variety, and conforming to Federal, State, latest American Association of Nurseryman (AAN) Standards and National Turf Evaluation Program (NTEP).
- B. Acceptable material in a seed mixture other than pure live seed consists of nonviable seed, chaff, hulls, live seed of crop plants and inert matter. The percentage of weed seed shall not exceed 0.05% by weight.
- C. All seed must be fresh seed. Seed that is left over from the previous year and beyond sell by date is not acceptable.
- D. Grass seed shall be certified "Blue Tag" seed composed of a blend of varieties mixed in proportion by weight and tested for minimum percentages of purity and germination. Submit the proposed mixture to the Architect for approval.
- E. Provide the following lawn seed mix:

1. General Lawn Type 1 and 2:

<u>Amount by Weight</u>	<u>Species or Variety</u>	<u>Purity</u>	<u>Percentage Germination</u>
40% (Min.)	Kentucky Bluegrass Blend*	95%	85%
35% (Max.)	Fine Textured Endophytic Perennial Rye**	98%	90%
25% (Min.)	Creeping Red Fescue***	97%	85%
100%			

- * Kentucky Bluegrass Blend shall contain no more than 25% of any one cultivar and always at least two (2) different cultivars. Acceptable cultivars: Rambo, Princeton-105, Wildwood, Allure, Coventry, Champagne, Northstar, Cardiff, Nimbus, Raven, SR2100, Misty, America, Brilliant, Limousine, Conni, Liberator, Apollo, NuGlade, Total, Eclipse, Unique, Impact, Midnight, Arcadia, and Serene or Architect approved equal.
- ** Perennial Rye Blend shall contain no more 30% of any one (1) cultivar and always at least three (3) different cultivars. Acceptable cultivars: Palmer III, Calypso II, Brightstar II, Secretariat, Monterey, Catalina, Pennant II, Premier II, Sonata, Sunshine and Ascend or Architect approved equal.
- *** SR5000 is acceptable.

2. Overseeding: Seed blend shall consist of 100% Perennial Ryegrass with at least three (3) cultivars. Acceptable Perennial Ryegrass cultivars include the following: Palmer III, Calypso II, Brighstar II, Secretariat, Monterey, Catalina, Pennant II, Premier II, Sonata, Sunshine, and Ascend. The Perennial Ryegrass shall have a minimum germination percentage of 90%. The percentage of weed seed shall not exceed 0.05% and other crop seed shall not exceed 0.5% by weight of the mixture.

F. Acceptable Seed Suppliers:

United Agri Products
Steve Hyde (315) 383-5035;

Matrix Turf Solutions
Jerry Clark (315) 480-7340;

Lesco, Inc.
Will Abel (315) 437-3423;

Preferred Seed
Jack Bryant (716) 895-7333;

Or Architect approved equal.

2.03 COMMERCIAL GROWN SOD

- A. Sod shall conform to NYSDOT Item 713-14 and be approved nursery grown mineral soil sod with 60% Kentucky Bluegrass and 40% Fine Fescue blend with a minimum (4) varieties. Muck grown sod is NOT acceptable. Installation of plastic netting is NOT acceptable.
- B. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable

grasses, stones, roots, thatch and extraneous material viable and capable of growth and development when planted. Sod is considered free of weeds when less than five (5) weeds are found per one hundred (100 s.f.) square feet.

- C. Thickness of Cut: Furnish sod machine cut at a uniform soil thickness of 0.60 inch at the time of cutting and of supplier's standard width, length, and thickness: uniformly 1" to 1-1/2" thick with clean cut edges. Measurement of thickness shall exclude top growth and thatch. Mow sod before stripping.
- D. Mowing Height: Before stripping, sod shall be mowed uniformly at a height of 1 to 1-1/2 inches.
- E. Thatch: Sod shall be relatively free of thatch, up to 1/2 inch allowable (un-compressed).
- F. Pad Size: Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be plus or minus 1/2 inch on width and plus or minus 5% on length. Broken pads and torn or uneven ends will not be acceptable.
- G. Strength of Sod Sections: Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section.
- H. Standard of Quality: Shall be Premium Sod supplied by Batavia Turf (800) 333-1472, Sky High Turf Farms (315) 687-6510, Saratoga Sod Farm (518) 664-5038, Lakeside Sod (716) 741-2877 or Architect approved equal.

2.04 LIMESTONE

- A. Shall be ground limestone in the producer's standard bags containing not less than 85% total carbonates and conforming to the following gradations:

<u>Sieve Designation</u>	<u>% Passing</u>
No. 100	50-100
No. 20	100

- B. The lime shall be uniform in composition, dry and free flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any lime which becomes caked or otherwise damaged making it unsuitable for use will be rejected.

2.05 TACKIFIER FOR SEEDED LAWNS

- A. Shall be liquid concentrate diluted with drinkable water forming a transparent three-dimensional film-like crust permeable to water and air, containing no agents toxic to seed germination to hold straw mulch in place.
- B. Standard of quality shall be Terra Tack or Architect approved equal.

2.06 FERTILIZER

- A. For Starter Fertilization: Immediately prior to seeding, fertilize with a commercial starter fertilizer, granular, non-burning product, with not less than 90% organic slow acting, micro nutrients and 1% iron, guaranteed analysis commercial fertilizer. Fertilizer ratio shall be: (1-2-1). Apply at a rate of 0.33 - 0.66 lbs of nitrogen (N) per 1,000 sf.

- B. For Subsequent and Final Fertilizations: Apply commercial fertilizer, poly coated granular non-burning product with not less than 90% organic slow acting, guaranteed analysis
 - 1. For Spring and Fall Lawn Work: Fertilizer ratio shall be: (3-0-1). Apply at rate of 1.5 - 2 lbs nitrogen (N)/1,000 s.f.

2.07 STRAW MAT FOR SEEDED LAWNS

See Specification Section 31 25 01.

2.08 MULCH FOR SEEDED LAWNS

- A. Dry Application Straw: Shall be straw consisting of clean stalks of oats, wheat, rye or other approved crops well seasoned before baling which are free of noxious weed seeds and roots. Weight shall be based on 15% moisture.
- B. Hydro Applications: Shall be hydromulch containing 100% wood fiber mulch. Standard of quality shall be Mat Fiber as manufactured by Mat, Inc. and distributed by Matrix Turf Solutions, (315) 468-6000 or Architect approved equal.

2.09 WATER: Free of substance harmful to lawn, other plants, and animals.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify limits of lawn and other types of ground cover materials in the field with drawings. Also any imported and screened topsoil areas. Notify Architect of discrepancies prior to proceeding with lawn work.
- B. Examine finish surfaces, grade, topsoil quality, and depth.
- C. Do not start lawn work until unsatisfactory conditions are corrected to the satisfaction of the Architect.

3.02 SPREAD TOPSOIL

- A. Limit preparation to areas which will be immediately seeded or sodded.
- B. Perform topsoil spreading operations only during dry weather.
- C. To insure a proper bond with the topsoil, disc, harrow, or otherwise scarify and loosen the lawn subgrade to a depth of four (4") inches before spreading topsoil.
- D. Spread topsoil to ensure a minimum settled depth of four (4") inches in lawn areas.

3.03 PREPARE GENERAL LAWN AREAS TYPE 1 AND 2

- A. Perform a pH test, sieve, and nutrient analysis of the topsoil and advise the results to the Architect prior to adding limestone or other soil amendments. Soil amendments shall be uniformly incorporated into the top four (4") inches of topsoil by discing, harrowing or other approved methods.

- B. Remove debris and stones 3/4" or larger by handpicking, fine tooth aluminum grading rakes, and mechanized stone picker. When topsoil has hardened, cultivate soil to a four (4") inch depth by plowing, discing, harrowing, or otherwise scarifying and loosening the topsoil.
- C. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Scarify, rake, level, and roll with a light static roller as necessary to obtain true, even lawn surfaces and fill depressions as required to drain. Correct irregularities in the surface resulting from tillage operations to prevent formation of depressions or water pockets.
- D. Cultivate soil to provide a firm bed of minimum of four (4") inches deep, free of clods, stones, or foreign matter over 3/4" in diameter from the top of soil. Do not move heavy objects except necessary lawn making equipment over the lawn areas after the soil is prepared unless it is again loosened and graded. Remove stones and all debris greater than one 3/4" in diameter during cultivation. Level undulations and irregularities in the surface.
- E. For pH correction provide adjusted rate of application as recommended in Topsoil Test Report submittal. For low pH correction: Add ground limestone at the rate indicated by the soil test. For high pH correction: Materials and application rates shall be determined by appropriate soil tests.
- F. Place starter fertilizer at the rate of 0.33 - 0.66 lbs. of nitrogen (N) per 1,000 sf. and mix into full depth of topsoil.
- G. Rake area with fine toothed aluminum grading rake before placing seed to obtain a smooth surface at the proper elevation. Drag area with a wood float to level out minor humps and hollows. Beds shall have a smooth friable uniform surface, free of areas ponding water.

3.04 LAWN SEEDING

- A. Notify Architect when seed bed is ready for review as specified in Job Conditions. Obtain Architect's approval of finish grade prior to seeding.
- B. Seed lawns immediately after preparation of bed and Architect's approval.
- C. For General Lawn Type 1 and 2:
 - 1. Seed at the rate of 6 lbs. per 1,000 S.F.
 - 2. Seeding shall be performed as follows: ½ rate and mechanically incorporated into the top ½" of topsoil. The remaining ½ rate shall be mechanically spread at 90 degrees to the first application and lightly rolled.

3.05 MULCHING SEEDED AREAS

- A. Mulch immediately after seeding.
- B. Dry Mulch Application: Place mulch by hand or by machine at a rate of one bale/1,000 s.f. to produce a light even mulch cover so that 50% of soil is visible through the mulch layer.

- C. Hydro Application: Place hydromulch by machine at a rate of one bale/1,000 sq. ft. to produce a light even mulch cover so that 50% of soil is visible through the mulch layer. NOTE: Seeding with a hydroseeder is NOT acceptable.
- D. Anchor mulch by thorough heavy coat of tackifier over entire area and watering.
- E. Protect seed bed from washout, wind erosion, rutting and drying out. Do not use machinery that leaves ruts in the seed bed. It is the Contractor's responsibility to add or remove mulch as needed to encourage optimum seed germination and growth.

3.06 INSTALL STRAW MAT

Install as specified in Section 31 25 01, Part 3.

3.07 SODDING

- A. Notify Architect that sod bed is ready for review as specified in Job Conditions. Obtain Architect's approval prior to sodding.
- B. Moistening the Soil: During periods of higher than optimal temperature for species being specified and after unevenness in the soil surface has been corrected, the soil shall be lightly moistened immediately prior to laying the sod.
- C. Sod immediately after preparation of bed and Architect's approval.
- D. Lay sod to form a solid mass with tightly-fitted joints in strips parallel to contours. Butt ends and sides of sod strips. Do not overlap edges. Stagger strips to offset joints in adjacent courses. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with finish grade of adjacent curbs, pavements, drainage structures and seeded areas.
- E. Do not lay dormant sod or install sod on soil surfaces that are hot, dry, saturated or frozen.
- F. When sodding slopes, install initial row of sod in a straight line, beginning at bottom of slope. Place subsequent rows parallel to and lightly against previously installed row.
- G. Sod strips laid in drainageways must meet the finished grades shown on the drawings.
- H. Sod abutting existing lawn or seeded lawns shall meet flush with top of sod pad (soil and thatch). Remove excess topsoil as necessary to meet flush.
- I. Stake sod in lawn swales and on lawn slopes 3H to 1V (horizontal to vertical) and steeper to prevent slippage. Use two (2) biodegradable stakes per square yard of sod. Stakes are to have their flat sides against the slope and be driven flush with sod surface.
- J. Roll with light static lawn roller to ensure contact with subgrade.
- K. As sodding is completed in anyone section, water sod thoroughly to a depth sufficient to ensure the underside of the new sod pad and topsoil immediately below the pad is thoroughly wet. Contractor is responsible to ensure there is an adequate water supply available prior to installation. Do not allow sod to dry out.

3.08 MAINTENANCE

- A. Maintenance by Contractor begins as soon as lawns are sodded or seeded. Protect lawns from drought, washout and wind erosion. In general, maintain new installed lawn areas, including watering, fertilizing, spot weeding, overseeding, mowing, applications of herbicides, fungicides, insecticides, and re-sodding until a full, uniform, healthy, vigorous stand of grass free of weed, undesirable grass species, disease, and insects is achieved and accepted by the Architect. Specifically:
1. Watering Seeded Lawns:
 - a. First Week: In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week to maintain moist soil to promptly germinate the lawn seed, preventing it from drying out, and keeping it in a healthy, growing condition until final acceptance. Lawn areas shall receive a minimum of one (1") of water per week, by natural rainfall, irrigation or a combination of both. Water daily until 2nd mowing (just enough water to keep the top ½" of soil moist, 1 time daily).
 2. Watering Sodded Lawns:
 - a. First Week: Soil on sod pads shall be kept moist. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantities to maintain moist soil to a depth of at least four (4") inches.
 3. Second and Subsequent Weeks: Contractor shall provide water to the lawns as required to maintain adequate moisture, in the upper four (4") inches of soil, necessary for the promotion of deep root growth until final acceptance. After 2nd mowing, water two (2) times weekly until thoroughly established.
 4. Protect: Protect lawn areas against trespass, vandalism and routine pedestrian traffic and Owner maintenance traffic by temporary fencing or other means.
 5. Repair: Repair, rework, resod and overseed (as originally specified for that area) areas that have washed out, eroded, do not germinate and are vandalized or otherwise damaged. Overseeding rates are to be adjusted to 6 lbs. of seed per 1,000 s.f.
 6. Mow: Initial mowing shall begin when the blade height reaches 2" and the soil will bear the weight of the lawn mower. Use mowers with low impact tires. For the first 3 mowings cut the grass blades to 1.5 inches. After that, mow the grass when it reaches a height of about 3.5" to a height of about 2.5". Never remove more than 1/3 of the grass blade at any one mowing. **A minimum of Three (3) mowings are required by contract** (approximately once per week after the initial germination period to final acceptance). Notify the Architect of dates in writing as mowing is performed. Excess clippings shall be carefully raked so as not to remove healthy grasses and removed.
 7. Fertilizer: After the third mowing, apply subsequent fertilizer at the rate of 1.5-2 lbs./1,000 s.f. Provide additional fertilizer after the final mowing as directed by the Architect to expedite the lawn maturation process.
 8. Weed Control: When infestation of weeds or crabgrass develops, treat infestation by hand weeding or herbicides control appropriate to the area. Furnish and install weed chemical control as recommended by manufacturer. Herbicides controls must be acceptable to the Owner. Obtain and pay for permits. Use as directed by the manufacturer and applicable laws, codes, ordinances and regulatory requirements. Under NO circumstances is it

acceptable to seed or overseed over Nutsedge, Crabgrass or other grassy/broadleaf weeds.

- B. Maintenance by the Contractor continues through the certificate of substantial completion to final acceptance by the Architect as described below. Maintenance by Owner begins after final acceptance of the lawn.

3.09 STANDARDS FOR SUBSTANTIAL COMPLETION OF LAWNS: Review to determine substantial completion of lawns will be made by the Architect, upon request.

- A. Lawn areas will be substantially complete provided requirements, including maintenance, have been complied with. A healthy, vigorous, uniform, partially mature stand of lawn is established free of weeds, undesirable grass species, disease, and insects. With proper watering and maintenance as indicated herein, this should culminate after an approximate 30 to 45-day period for initial germination with average temperatures above 40°F. Grass roots shall have matured to a minimum of 1½" depth as determined by the Architect when core samples are taken.
- B. Lawn areas shall not have more than 10% dead/bare spots.
- C. Contractor shall provide a written copy of all maintenance activities performed up to this date.
- D. The architect will prepare a written punch list of items which need correction prior to final acceptance.

3.10 STANDARDS FOR FINAL ACCEPTANCE OF LAWNS: Review to determine final acceptance of lawns will be made by the Architect, upon request.

- A. Lawn areas will be acceptable provided requirements, including maintenance, have been complied with. A healthy, vigorous, uniform, full stand of lawn is established free of weeds, undesirable grass species, disease, and insects. Grass roots shall have matured to a minimum of 2" depth as determined by the Architect when core samples are taken.
- B. Any lawn which contains disease, more than 1% dead/bare spots, or any dead/bare area greater than one (1) square foot shall be rejected and the unacceptable area(s) repaired as originally specified at no additional cost to the Owner.
- C. In the event the Contractor fails to complete the punch list items within a 30-day period with average temperatures of 40°F after the time of Substantial Completion, the Contractor shall be liable to the Owner for any additional costs including those charged by the Architect.
- D. Contractor shall provide a written copy of all maintenance activities performed during the contract up to final acceptance of lawns.

3.11 CLEAN UP

During the contract and at intervals as directed by the Architect and as lawn work is completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, neat, well-draining condition.

END OF SECTION

**SECTION 33 30 00
SITE SANITARY**

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of Site Sanitary work is shown on the drawings.
- B. Sanitary work includes, but is not limited to:
 - 1. Concrete manhole adaptors
 - 2. Trenching and Backfilling
 - 3. Piping and jointing to five feet from exterior building face
 - 4. Connections to existing sanitary systems
 - 5. Concrete cradles, saddles and collars (if required)
 - 6. Clean Up
- C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 321301 - Site Concrete Work
- B. Section 334001 - Storm Drainage

1.03 SUBMITTALS: (See Section 311201, 1.5)

- A. Provide Manufacturer's Product Data (MPD) and Shop Drawings for:
 - 1. Pipe and jointing MPD only
 - 2. Concrete manhole adaptors
- B. Provide Material Certificates: Also, samples as noted.
 - 1. Granular Backfill: Sample
- C. Provide Permits, Test Results, Certifications and Operator's Manuals as noted below:
 - 1. Certification: As required in 1.04 E and 3.12 below.

1.04 JOB CONDITIONS

- A. Job conditions in Section 334001 – Storm Drainage apply.
- B. Sewer work shall conform to standards of applicable government authorities having jurisdiction. Obtain and pay for permits and approvals required by local authorities. Copy permits to Architect.
- C. Notify County Engineer/ DPW or applicable government authority having authority in writing two (2 wks.) weeks prior to start of work. Copy letter to Architect.
- D. Certification: The sanitary system must be installed and certified by a licensed county Plumber when required by municipal or state law.

PART 2 - PRODUCTS

2.01 GRANULAR BACKFILL

- A. Backfill for piping and sanitary structures shall be as specified in Section 312201, 2.1, B.

2.02 PIPING

- A. P.V.C. Gravity Sewer Pipe shall conform to ASTM D-3034, SDR 35. Joints shall be rubber flexible gasketed joints conforming to the ASTM F477.

PART 3 - EXECUTION

3.01 CONNECTIONS TO OTHER SANITARY SYSTEMS

- A. Connections at Building(s):
 - 1. Locate accurately per site and plumbing drawings. Verify inverts and sizes. Notify Architect of any discrepancies immediately, prior to installation.
 - 2. Install pipe and jointing to five (5') feet from the exterior building face.
 - 3. Cap end and mark.
 - 4. The Plumbing Contractor will make connection.
- B. Connections to existing Sanitary Systems:
 - 1. Locate accurately per drawings. Verify inverts and sizes. Notify Architect of any discrepancies immediately, prior to installation. Coordinate with the Municipality and other agencies having authority. Obtain require permit(s).
 - 2. Notify governing agency in writing a minimum of two (2 weeks) weeks prior to anticipated date of connection. Copy letter to Architect.
 - 3. Connect the site sanitary system to the laterals or manholes as indicated.
 - 4. Connect lateral lines into main with approved, water-tight duplex adaptor and 45-degree bend to the sewer main.
 - 5. TEE lateral Connection to sewer main: Geneco T-wye saddle with stainless steel t-bolts and stainless-steel swivel pins, strap and nuts.
 - 6. Manhole connections shall be made with approved concrete manhole adaptors.
 - 7. Pipe sleeves shall be 2 pipe sizes larger than the specified pipe diameter.

3.02 TRENCHING AND BACKFILL

Shall be as described in Section 334001, 3.2.

3.03 PIPE LAYING

- A. Bed pipe in granular backfill or concrete as shown on drawings, compact under spring line of pipe to assure firm support. Align pipe to line and grade given in plan and profile. Set batter boards or set by laser level.
- B. Place backfill around pipes to equal depths on both sides as work progresses. Compact trenches to at least ninety-five (95%) percent maximum density as specified in Section 312201.
- C. P.V.C. pipe push type joints shall be made using the flexible gaskets specified. Push together pipes so that the gasket is firmly seated in the socket.
- D. "Lamp" pipes to check for misalignment and breakage after backfilling has been completed. Replace pipes deviating more than 1/2" from line or grade at no additional cost to the Owner.

- E. Concrete cradles, saddles and collars: Refer to Section 321301, Part 3.

3.04 PROVIDE CERTIFICATION

- A. Provide written certification from the Municipal Engineer that the sanitary work in the public right of way has been installed in a manner satisfactory to the governing agency having authority over the work. Provide certification prior to Architect issuing final acceptance.
- B. Patch road cuts, sidewalks, lawns or other surfaces in accordance with applicable municipal standard.
- C. Provide record survey of finished sewer work.

3.05 CLEAN UP

During the contract and at intervals as directed by the Architect and as the sanitary sewer system is completed, clear the site of pipe, trench and backfill material, stone, concrete and debris. Leave the site in a clean, safe, well draining, and neat condition.

END OF SECTION 33 30 00

SECTION 33 40 01

STORM DRAINAGE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of the storm drainage is shown on the drawings.
- B. Storm drainage work includes, but is not limited to:
 - 1. Trenching, backfilling and compaction
 - 2. Storm structures, castings, and appurtenances
 - 3. Piping, jointing and fittings
 - 4. Connection(s) to other storm system(s)
 - 5. Adjusting existing storm structures and other utilities
 - 6. Flared end section(s)
 - 7. Storm Water Management Trench (SMT)
 - 8. Clean Up
- C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 12 01 - Site Preparation
- B. Section 31 25 01 - Erosion, Sediment and Pollution Control
- C. Section 31 22 01 - Site Earthwork: For Elaboration of Shoring and Bracing, Dewatering, Backfilling, Compaction and Field Quality Control Testing.
- D. Section 32 12 01 - Asphalt Paving
- E. Section 32 13 01 - Site Concrete

1.03 REFERENCES

- A. ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity Flow Applications.

1.04 SUBMITTALS: (See Section 31 12 01, 1.05)

- A. Shop Drawings (SD) required for:
 - 1. Precast concrete drainage structures showing sizes, elevations for openings and, HS20 loading certification.
 - 2. Area Drain Structures
- B. Manufacturer's Product Data (MPD) required for:
 - 1. Drainage structures and castings
 - 2. Pipe, joints and fittings
 - 3. Stormwater Management Trench for Pipes and Geotextiles
 - 4. Flared End Section(s)

C. Quality Control Submittals:

1. Provide a list of completed projects including Owner's contact information for each project, demonstrating compliance with applicable "Experience Requirements" specified in "Quality Assurance" of this specification section.

1.05 QUALITY ASSURANCE

A. Drainage Contractor Experience Requirements:

1. Submit business name, business owner(s) name(s), business address, telephone number, website and/or email address signed by the Contractor/Subcontractor who meets the qualifications set forth in this specification and is proposed by the Contractor to perform the Drainage for this Project.
2. Provide a list of at least four (4) Drainage work projects of comparable size, scope and quality completed successfully by the proposed Contractor/Subcontractor within the past three (3) years that includes the date completed, project Owner's name and current contact information, including telephone numbers and email addresses.

1.06 JOB CONDITIONS

- A. Job conditions in Section 31 22 01 apply.
- B. Plan and execute piping work so that trenches are not opened for more than two hundred (200') feet in advance or left unfilled more than one hundred (100') feet behind. No overnight open excavation is permitted.
- C. CERTIFICATION OF STORM SYSTEM: The storm system must be installed and certified by a licensed County Plumber when required by municipal code or state law.
- D. CONSTRUCTION REVIEW: Notify the Architect when the storm system is approximately 25%, 50% and 95% complete.

PART 2 - PRODUCTS

2.01 BACKFILL

- A. Backfill for pipes, Stormwater Management Trenches (SMT), and drainage structures shall be as specified in Section 31 22 01.

2.02 STORM STRUCTURES AND CASTINGS

A. Storm Inlets and Manholes:

1. Shall be precast reinforced portland cement concrete conforming to the size(s) and shape shown on drawings, designed for AASHTO HS-20 loading. The materials and structural design of the structures shall be per ASTM C478 and ASTM A497, Grade 60. The minimum compressive strength of the concrete in the structure base, riser, and top section shall be 5,000 psi. The minimum wall thickness shall be one twelfth of the internal diameter of the riser or largest cone diameter. All joints shall be waterproofed with O-ring rubber gaskets and sealed with a mastic treatment in accordance with ASTM C990. Any grout used within

the system shall meet the ASTM C 1107. Manhole connector holes shall be equipped with a seal gasket that meets or exceeds material specification of ASTM C-923 or other locally approved methods. Base units shall be extended. Standard of quality shall be as manufactured by Zeiser Wilbert, Jefferson Concrete, Fort Miller or Architect approved equal.

2. Castings: Provide HS20 loading and bike safe grates, ductile iron meeting grade 65-45-12 as determined by ASTM A536-84, sizes as noted on the plans. Frames, covers and grates shall be machined to prohibit rocking. Standard of Quality shall be Neenah Foundry, East Jordan Iron Works, US Foundry, or Architect approved equal.

2.03 STORM STRUCTURE APPURTENANCES

- A. Precast Concrete Adjustment Rings: Shall be square or round depending on structure. Built in accordance to ASTM C478, and made of 5,000 psi concrete and reinforced steel, meeting ASTM A615 Grade 60, as manufactured by Fort Miller, Zeiser Wilbert, Jefferson Concrete or Architect approved equal.
- B. Steps: Shall be copolymer polypropylene plastic reinforced with 1/2" diameter grade 60 steel as manufactured by M.A. Industries or Architect approved equal.
- C. Mortar: Shall be lime, cement, and clean sand, 1:1:3 measured by volume, meeting ASTM C1107.
- D. Coal Tar Sealer: Shall be used to coat the inside and outside of installed precast risers. Standard of quality shall be Hydralastic 836 as manufactured by W. R. Meadows, (800) 342-5976 or Architect approved equal.

2.04 PIPING

- A. High Density Polyethylene Pipe (HDPE): Shall be heavy duty dual wall, high density polyethylene (HDPE) pipe conforming to ASTM F2648 for 4" to 60" pipe with a smooth inner wall, annular corrugations, "n" flow rating of 0.012, and HS-20 loading capability with minimum one (1') foot cover for 4" to 48" pipe and two (2') foot cover for 6-" pipe. Joint couplings for pipe shall be connected using a bell & spigot joint, meeting AASHTO M252, AASHTO M294, or ASTM F2306. The joint shall be soil tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Standard of quality shall be N-12 Mega Green ST IB pipe as manufactured by Advanced Drainage Systems, Inc., 800-821 6710, or Architect approved equal.

2.05 FLARED END SECTION(S)

- A. Flared end sections used with CMP pipe shall conform to ASTM A760 and ASTM A849-00 for asphalt coated galvanized steel, Class I or II, 10 gauge.
- B. Flared end sections for HDPE pipe shall be high density polyethylene.

2.06 STORM WATER MANAGEMENT TRENCH

- A. 4" to 10" Pipe: Shall be flexible, heavy duty, corrugated interior and exterior, perforated (or slotted) polyethylene pipe meeting requirements ASTM F-667 for 4" to 10" diameters. Standard of quality shall be ADS with prefabricated snap fittings as manufactured by Advanced Drainage Systems, Inc., (614) 457-3051 or Architect approved equal. Size pipe(s) as noted on drawings.

- B. 12" to 24" Pipe and Fittings: Shall be heavy duty polyethylene (HDPE), corrugated interior and exterior, perforated pipe meeting requirements AASHTO M252, AASHTO M294, Type C. Standard of quality shall be ADS with prefabricated fittings as manufactured by Advanced Drainage Systems, Inc., (614) 457-3051 or Architect approved equal. Size pipe(s) as noted on drawings.
- C. 4" to 12" Fittings: Shall be injection molded fittings with a smooth interior and exterior meeting requirements AASHTO M252 for 4" to 10" diameters, and ASTM M294 or ASTM F2306 for 12" diameter. Standard of quality as manufactured by Advanced Drainage Systems, Inc., (614) 457-3051 or Architect approved equal. Size pipe(s) as noted on drawings.
- D. Backfill: Shall be clean, washed No. 1 stone as indicated in Section 31 22 01.
- E. Soil Separation Fabric: Shall be a commercially manufactured non- woven polypropylene filter fabric. Standard of quality shall be Mirafi 140N as manufactured by TenCate or Architect approved equal.

PART 3 - EXECUTION

3.01 CONNECTIONS TO OTHER STORM SYSTEM

- A. Connections to existing Storm Systems:
 - 1. Coordinate with the Municipality and other agencies having jurisdiction. Notify governing agency in writing a minimum of two (2) weeks prior to anticipated date of connection so that field procedures and installation can be reviewed by a representative of the Municipality. Copy letter to Architect.
 - 2. Locate accurately per drawings. Verify inverts and sizes. Notify Architect of any discrepancies immediately, prior to installation.
 - 3. Make connections securely, watertight and as detailed. Provide all necessary couplers and fittings to make connections.

3.02 TRENCHING AND BACKFILL

- A. Reference: Refer to Section 31 22 01 for elaboration of shoring and bracing, supporting, rock, dewatering, and backfilling.
- B. Trenching:
 - 1. Remove material encountered to the depth shown on drawings and with a maximum width of fourteen (14") inches and a minimum of nine (9") inches each side of conduit springline as detailed. Provide safe shoring, sheeting, and bracing. Remove before backfilling. Backfill excess or over excavation as described in Section 312201 to proper line and grade. Compact to 95% density.
 - 2. When unsatisfactory soil materials are encountered at design elevations, immediately notify the Architect in writing via email. Continue as directed by the Architect. When conditions are not a result of Contractor's negligence, additional excavation may be directed by the Architect and paid for as a Change Order on a unit price basis in accordance with specification Section 31 22 01.

- C. Water: Remove from trenches; drain trenches and/or provide sump pits and pumping equipment as necessary to keep trenches stable and dry at no additional cost to the Owner.
- D. Soft Material in Trench Bottom: Dry out and stabilize or remove and replace with imported granular backfill material to achieve firm, stable foundation at no additional cost to the Owner.
- E. Rock: Remove boulders and rock within one (1'-0") foot of pipe. Provide one (1'-0") foot of granular backfill between rock and conduits at no additional cost to the Owner.
- F. Backfill: Conform to details on drawings and as specified. Compact backfill to a minimum 95% of optimum density.

3.03 STORM STRUCTURES INSTALLATION

- A. Pre-Cast Structures:
 - 1. Install with corresponding extended precast base section. Precast base units shall be modified in the factory to have the correct size openings for piping.
 - 2. Provide drainage structures as detailed, built to finished grades given. Backfill with imported granular backfill material around drainage structure and compact to 95% density to avoid settlement.
 - 3. Mortaring: Thoroughly wet concrete risers before laying. Mortar joints. Joints shall be completely full and struck flush.
 - 4. Install any required steps in a continuous flight, avoiding any conflict with piping.
 - 5. Construct channels in base of storm structures for positive flow from inlet to outlet piping where detailed.
 - 6. Build completed structure to avoid any infiltration or exfiltration of water except at underdrains or storm water management trenches.

3.04 CASTINGS

- A. Provide the type specified and shown on drawings. Build to the finish grade as shown on drawings.
- B. Set castings firmly. Loose or rocking castings shall be rejected by the Architect.

3.05 ADJUSTING EXISTING UTILITIES

Adjust existing utilities as necessary to maintain utility service and meet finished grade conditions. Existing utilities include but are not limited to the following: water valves, gas valves, utility structure rims, cable and telephone markers, and sanitary cleanouts.

3.06 PIPE LAYING

- A. Shall be in accordance with ASTM D2321 and pipe manufacturer requirements.
- B. Bed pipe in granular backfill or concrete as shown on drawings, compact under springline of pipe to assure firm support. Align pipe to line and grade given in plan and profile. Set batter boards or set by laser level.

- C. Pipe joints shall be made using the flexible gaskets specified. Clean bell end of any debris and lubricate. Remove protective wrap from gasket. Do not allow lubricated section to touch dirt or backfill. Foreign matter could adhere to surface and compromise joint integrity. Push together pipes so that the gasket is firmly seated in the socket. Always push spigot end into bell, not bell end into spigot.
- D. Place backfill around pipes to equal depths on both sides as work progresses.
- E. Attach flared end sections as detailed to pipe outlets, draw up bolts tight to provide firm anchorage.
- F. "Lamp" pipes to check for misalignment and breakage after backfilling has been completed. Replace pipes deviating more than 1/2" from line or grade at no additional cost to the Owner.

3.07 CONCRETE COLLARS (if required)

As specified in Section 32 13 01.

3.08 STORM WATER MANAGEMENT TRENCH

- A. Use only pipe which is undamaged and flexible (have not been exposed to direct sunlight for more than six (6) months causing brittleness, cracking or splitting prior to placement). Pipe shall be stored for at least twenty-four (24 hrs.) hours in an area having a minimum temperature of fifty (50) degrees F.
- B. Trenching: Remove material encountered to the depth shown on the drawings. Provide shoring, sheeting, and bracing as necessary for safety; remove before backfilling.
- C. Install continuous envelope of soil separation fabric around the backfill up to subgrade of finish material. Fill stone to proper elevation and wrap top. Overlap fabric minimum twenty-four (24") inches at top and joints. Secure fabric joints to prevent separation and infiltration of adjacent materials and separation of fabric.
- D. Install pipe sloped as shown on drawings.
- E. Compact backfill to maximum density of adjacent materials.

3.09 FIELD QUALITY CONTROL

- A. Density Testing: Perform all density testing for piping trenches and structure backfill as indicated in Section 31 22 01.

3.10 CLEAN UP

- A. During the contract and at intervals as directed by the Architect and as storm drainage is completed, clear the site of pipe, trench and backfill material, stone, concrete and debris. Leave the site in a clean, safe, well draining, neat condition.
- B. Clean drainage structures, storm water management trenches and pipes: Clean out sediment, rubbish, construction debris, and foreign objects thoroughly, immediately prior to final acceptance.

END OF SECTION